PERSONAL COMPUTER MAGAZINE

BITS & BYTES

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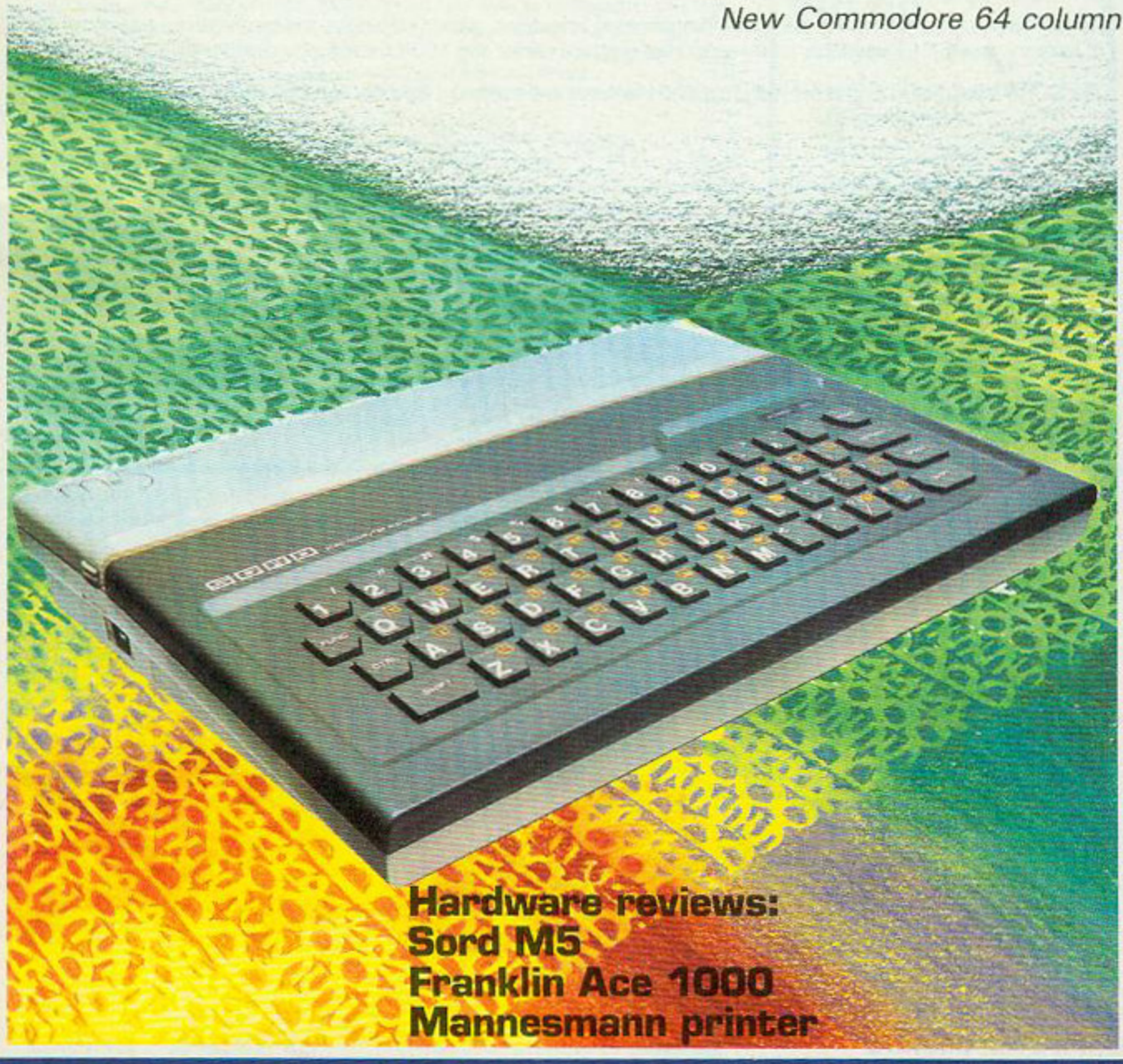
Issue No. 11, August 1983: $1.00

Working with words — wordprocessing feature

The story of CP/M

CalcStar spreadsheet program reviewed

New Commodore 64 column



Hardware reviews:
Sord M5
Franklin Ace 1000
Mannesmann printer

SORD m5

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BITS & BYTES

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Contents

Columns

Regular features

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Telephone: 66-566.

Advertising

Co-ordinator – Paul Crooks, telephone 66-566, Christchurch.
Representatives –
Auckland: Wendy Whitehead, telephone 504-649 (w), 545-328 (h), Box 534, Auckland.
Wellington: Marc Heymann, telephone 858-481 or 844-985, P.O. Box 27-205, Wellington.

Editorial

Editor – Neill Birss, P.O. Box 827, Christchurch.
Representatives –
Auckland: – Cathy and Selwyn Arrow, 30A Bracken Ave., Takapuna.
Wellington: Shayne Doyle, 18 Holdsworth Ave., Upper Hutt, telephone 280-333 ext. 892 (w), 278-545 (h).

Merchandise

Book club and software manager: Dion Crooks.

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EDITORIAL

Garbage in, gold out

A start at last. That's what many high school teachers must feel about the announcement by the Minister of Education, Mr Wellington, of a central computer development from next February. With a staff of two and other teachers seconded to it, this will evaluate existing programs used in schools and provide information and advice.

But it is clear that the main drive for the use of computers in schools will still have to come from teachers, parents, and school boards. This is not all bad. Schools that must evaluate for themselves may gain greater knowledge and motivation than when the "gen" comes packaged from the bureaucracy in Wellington. A diversity of brands may stimulate more original programs and lead to greater skills as teachers turn to adapting programs from different machines.

Some will argue that the politicians' apathy will mean that schools in poorer suburbs and newer schools will be at a relative disadvantage in giving their pupils equality of opportunity in computer education. But polytechnics' courses in micro programming are being swamped. There are opportunities for schools to use their micros to run evening and week-end adult classes, earning money for the teachers and paying for some of the equipment costs.

And most are aware that the ridiculous computer tax has the great benefit of allowing schools to upgrade their equipment by enabling them to sell their old micros at a price that approximates that of new, tax-free equipment.

It's true that successive Governments have blundered in their computer policies. The benefits outlined above are accidental side effects of 12 years or more of stumbling, often ignorant, generally wrong, political and high-department reaction to computers and to new technology generally.

But the growing core of local expertise and enthusiasm in schools, filling the void where a national computer policy might have been, will undoubtedly form a pressure group that will improve computer education. We may eventually get a better system than if we had from the first been working under a national, co-ordinated policy on school computers.

If the politicians can't lead in this matter, let's take them along with us.

— Neill Birss

Our opinions. From now on, all editorials in "Bits & Bytes" will appear over a name. (This policy is retrospective. The editorial about the computer tax in the July issue was by Paul Crooks.)

We're nearly a year old!

. . . and that means it's almost time for founder subscribers to renew their subs!

If you subscribed from the October, 1982, edition you'll need to renew your sub from next month. You can do it in advance: just use the subscription card in this issue. (Remember to tick the renewal box.) P.S.: if you've forgotten when you subscribed look at the code on the magazine label. H/A or H/S means your sub expires in September.

Remember it's cheaper by subscription.

Post your subscription today

MICRO NEWS

New Radio Shack agents

Radio Shack, manufacturers of the TRS 80 range of computers, has appointed Porterfield Computers Ltd as official Radio Shack agents for the Auckland area.

Radio Shack has also released the new Model 4. This model looks similar to a Model 3 but has several new features.

Some of the standard features are 64K RAM (optional 128K), RS232 interface, parallel printer interface and a Z80 operating at 4mHz, twice as fast as the Model 3 microprocessor.

Also standard are 80 column display or 40 character display, software selectable or when using TRSDOS 1.3 or LDOS 5.13 either 64 or 32 character display is available.

The Model 4 takes full advantage of the vast software pool that has been written and is available for the Model 3 by executing all Model 3 software without hardware or software conversions.

Probably the most interesting feature is the Model 4's ability to run CP/M as the hardware is built in and only requires a CP/M diskette to be loaded before running programs.

Porterfield Computers will be importing Model 4's at $5995

Computer of the year in New Zealand

The computer recently named "computer of the year" by Australian computer magazine "Your Computer" has now been released here.

It is the NEC APC (Advanced Personal Computer) a 16 bit machine (8086 compatible processor) which comes in two basic models, colour and monochrome. Both models incorporate 12 inch (across the diagonal) monitors and display 25 lines of 80 characters.

The monochrome model, priced at around $7300, combines a green/black high resolution monitor, 128K bytes of RAM, a single 8 inch floppy disk drive (upgradeable to a second drive) giving a solid one megabyte of storage and a detachable keyboard.

The colour model, which includes two disk drives, is priced at $10,900. It is otherwise identical except that its high resolution monitor displays eight colours.

And in spite of the fact that APC is aimed at the business market (it runs CP/M 86 and MSDOS operating systems) it has an incredible graphics capability.

Graphics resolution is 1024 by 1024 pixels of which a movable 640 (horizontal) by 475 (vertical) pixel "window" can be displayed at one time.

But more on that in our full review of the APC which will appear shortly. New Zealand agents for the APC are Scollay Computers, P.O. Box 2377, Wellington.

New Epsons

Demand is running high for the new Epson QX10 range which will be released in New Zealand this month. There are three models: the first has 64K RAM and runs CP/M and MBASIC; the second, with 192K RAM, has CP/M and a special multi-font BASIC giving 16 print styles on screen; the third, with 256K RAM runs special VALDOCS software which users are said to be able to learn in minutes.

The first three shipments of the 64K and the 192K machines have been pre-sold. The machines will sell in New Zealand at: $5120 for the 64K, including dual disk drive and screen; $5851 for the 192K model also with drives and screen; a price has yet to be decided on for the third model. The national distributor, Microprocessor Developments, Ltd, reports that the smaller Epson, the HX20, is still in demand. Since its release in December, about 500 have been sold in New Zealand.

TI here late this year

The Texas Instruments Model 99/4A Home Computer will be available in New Zealand some time during the 4th quarter, 1983.

Negotiations are currently underway with several companies, and an announcement will be made later in the year regarding sales outlets and retail price in New Zealand.

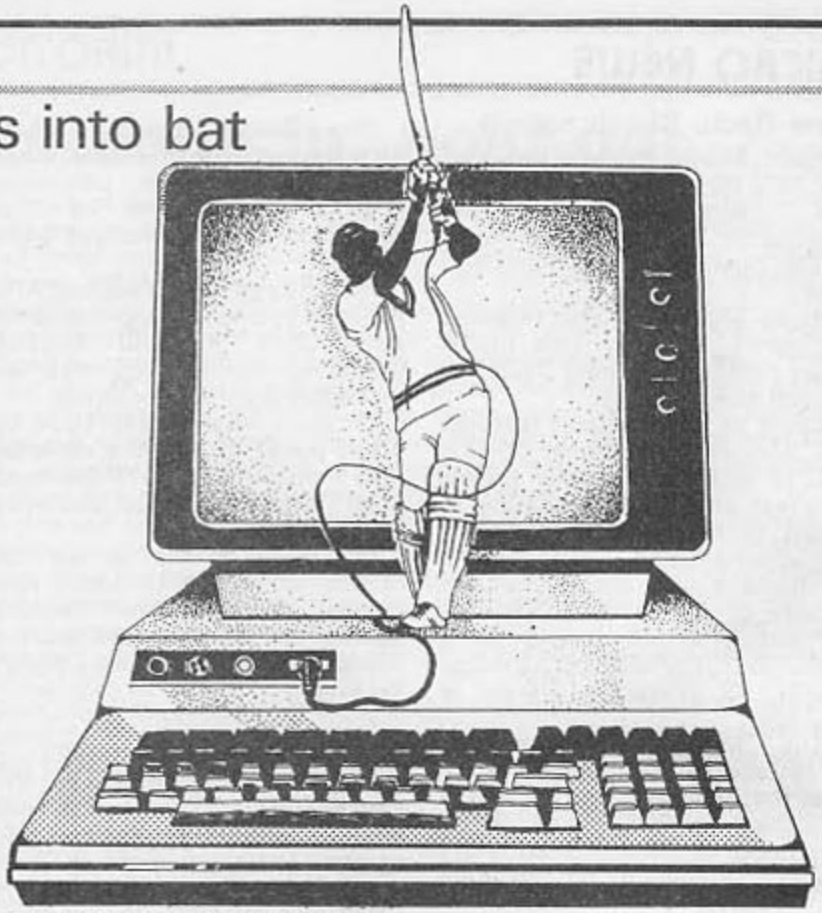
VIC 20's

The VIC20 will soon be on sale in department stores. This follows the appointment of Fountain Marketing as a sub-agent. Stores who will sell the machines include: Farmer's, Smith and Brown, Wrightson NMA, and Wilson Neill.

Another one

The new machines keep coming and coming. Mattel, a big American corporation that specialises in toymaking, is bringing out a personal called the Aquarius, which will sell for about $US300 in America.

Putting computers into bat



Two Indian engineers are trying to solve the problem of controversial cricket umpiring decisions by computer science.

The scheme involves linking radio transmitters in bat and pads to a giant electronic scoreboard. Their aim is to "enable the umpire to make decisions based on fact, not personal judgement".

It all began when India's cricket captain, Sunil Gavaskar, walked off the pitch with his opening partner, Chetan Chauhan, in protest against an umpiring decision during the 1981 test series against Australia. That incident was smoothed over but umpiring controversies have since become a regular feature of the game.

Now, a 32-year-old researcher, Krishna Kant, a senior systems engineer in the government's electronics commission, helped by his former colleague, A.K. Teckchandani, now settled in USA, has come up with a computer system which tells an umpire whether the ball touched pad or bat or both and if both, which one first.

The system envisages a small transmitter into the bat. If the ball touches the bat, the device would transmit a radio frequency signal to a computer near the scoreboard.

A similar set-up could also show if the ball hit the batsman's pad. A ball striking both bat and pad would show up on the computer, which would detect which signal came first and display it on the screen.

On leg-before-wicket decisions, it would be helpful but not definite, because the umpire would still have to decide whether the ball would have hit the stumps had it not been deflected by the pads.

The system requires large display screens so that umpires can see them from the centre of the ground.

The main technical problem appears to rise from the possibility of a malfunctioning of the sensors or a break in the connection, and how the devices would be replaced.

* * * *

New Casio

A new Z80A based Casio microcomputer has just been released by Monaco Distributors of Auckland.

Priced at just under $7,000 the basic unit comprises computers, keyboard, monochrome screen, dual 640K disk drives and MX-80 type III printer.

CP/M based Wordstar; Mail Merge, Supersort, Supercalc, COBOL, PASCAL, Z80 Assembler are included in the range of system software available. Plus the IAL Charter Series, the IMS Ascent Series and the usual games.

Options available are I/O Expansion box: RS 232C; 16K RAM PAC (with battery back-up) and ROM PAC, whilst CP/M is available on disk.

In addition to the full QWERTY keyboard and programmable function keys there is a full calculator keyboard.

This powerful system comes in well designed stackable units with tiltable stand for the monitor and is the "CASIO" FP 1000 microcomputer.

MICRO NEWS

British scene

Recent sales charts indicate that the 16-bit competition in Britain is heating up, as is the business micro war generally. The more expensive machines over $2400 are now topped by the portable, 8-bit Osborne which qualifies as expensive only by virtue of its pricing, including disks and software. The more exciting competition is for the second slot. This is taken at present by the Sirius, a more substantial desk-top system not directly in competition with the Osborne. However, both Digital Equipment (DEC) and IBM are challenging for the top slot in the desk-top market. IBM has risen to No. 3 in the last few months, the DEC Rainbow slipping in at No. 8 and rising.

In the cheaper market the Apple IIe has begun to rise, and a Sord computer has entered the best-seller list for the first time. Meanwhile, price cutting has reduced the Texas 99/A to below 100 pounds.

Acorn late

Predictable news of the month. The new Acorn computer, the Electron, will be delayed two months in its launch. When will someone buy Acorn a project scheduling program?

Hard disk swaps

Apple U.K. is already into replaceable hard disk cartridges. The Genie 5+5 has crossed the Atlantic with 10 megabytes in two 5¼in hard disks, one of which has cheap (by comparison) replaceable cartridges. The disks have gained in price on the way, up to 3800 pounds.

Accelerator II

Another way of speeding up your Apple is on the market in Britain: the Accelerator, a second processor board based on the 6502B processor. This chip is identical to the 6502 used by the Apple but runs at 3.6 times the speed. Execution speeds on all processing with a low input/output component are enhanced 2.5-3.5 times according to "Personal Computer News" benchmarks.

Micro-drive

The latest date for the U.K. release of Sinclair's microdrive (a 100K, $100 storage device for the ZX-81 and Spectrum) is August. Technical details are still hazy but each computer will need a $70 expansion interface. However, this will also allow serial communications, links to 64 other Spectrums and up to 8 microdrives on one interface.

Portable package for life agents

Sirius Systems Limited has developed a software package to assist life insurance agents. It will be marketed by Sirius under the name Prompt and is designed to manage the agent's contacts with clients and potential clients.

Prompt is designed to operate on the Osborne portable microcomputer.

The system maintains information under three categories:

- 'suspects' which are people with whom no actual contact has yet been made, but where the agent is endeavouring to establish such contact.
- 'prospects' with whom contact has been made and where proposals are being formulated or considered.
- 'clients' with whom business is being or has been conducted.

The system keeps track of appointment dates as well as family and policy anniversaries.

The agent can select a subset from any category on the basis of age, area, financial status etc, and provision is made for producing mailing lists for use with the Wordstar word processing system.

Sirius Systems has developed a package of business-oriented plotting programs for use with microcomputers.

The new package will be known as Schema and is written in BASIC for easy implementation on a wide-range of hardware. Techniques have been incorporated to facilitate rapid adaption for most plotters.

Data may be drawn in any of the commonly used graphical presentations; pie-charts, line graphs, or histograms. Also included is the means to create diagrams or pictures from a combination of geometric shapes.

Japan standards

Fourteen Japanese manufacturers have signed a technical agreement that will lead to common standards for their personal computers. The standards were developed by Microsoft.

MICRO NEWS

Sord upgrades

A plug in 16-bit processor cartridge that enables the Sord M23 to run MS-DOS software as well as CP/M has been put on the market.

Also in the pipeline is a 68000-based 16-bit system, the M68. This will have a "slave" Z80 processor so that it can run all M23 software as well as software for the 68000.

Large crowds at exhibition

Queues of people waiting to gain entry were a common sight at the fourth annual Microcomputer Exhibition in Auckland.

The one day display held on Saturday, July 2 attracted more than 7500 people in spite of cold, windy weather.

The result was the 35 commercial exhibitors and the various computer user groups were kept very busy answering questions, giving demonstrations and finding enough brochures etc to quench the thirst for information.

New computers on display included the Colour Genie, Jupiter Ace, Franklin Ace, Casio FR 1000 and NEC APC (see other articles this issue for more details).

And if you are wondering who the man in the white suit and bowler hat is, he is Mr Chris McEwan from the Canberra Microcomputer Club. He was a quest of the exhibition organisers the New Zealand Microcomputer Club and no doubt his Auckland television appearance and Queen St strolls helped boost interest in the exhibition.

Visitors at the K'Rd Video and Computer and "Bits & Bytes" stands at the Auckland Microcomputer Exhibition.

Commodore 64

The 64 Portable models will not be released in New Zealand until later this year. The Commodore B 700 and BX 700 series will be released at the Systems '83 show in Auckland this month. The BX series is a 16-bit machine.

Colour Genie from Video Genie makers

Two new computers have been released here by a new computer company, Rakon Computers.

The first, a home computer, the Colour Genie, is a new offering from the same company that produced the Video Genie, a TRS 80/System 80 clone. The Colour Genie also has a Z80 processor but unlike its predecessor is only partially compatible with TRS/80 System 80s.

However Rakon says it already has more than 80 programs available with more coming.

The Colour Genie does have an impressive amount of basic RAM available, 32K, together with 16K ROM of Microsoft BASIC and an array of interfaces built-in. These include an RS232C serial port for a modem, a light pen port, a parallel port for a printer, cassette recorder port, (which can load and save programs at a fast 1200 baud) audio and video outputs and an extension port for adding up to three disk drives.

The price tag on the Colour Genie is $795. BITS & BYTES hopes to have a full review soon.

The second computer system, the SAGE II and IV are in the super-micro class with the virtual 32 Bit Motorola 68000 chip giving two million instructions per second. The smallest configuration (if it can be called small) SAGE II with 128K or RAM and one 640K floppy is aimed at becoming the ultimate home and essential small business computer at around $6,900.00. The configurations are flexible up to the SAGE IV; 1 megabyte of RAM and 240 megabytes of hard disk all in the same cabinet.

SAGE II and IV are fully supported with software, each coming with the powerful p-System which converts software originally written for 8 and 16 Bit computers in Pascal, Basic and Fortran. Modula 2 and Hyper-Forth systems are available together with CP/M – 68K which with its C compiler will allow UNIX software to be compiled.

Rakon Computers (P.O. Box 9308, Auckland) is part of Rakon Industries, Ltd, a manufacturer of piezo quartz crystals.

"Give me one good reason why I should choose a VIC 20 home computer."

1. VIC is outstanding value for money. No other colour home computer can give so much for only $595.

2. Total standard memory 25K made up of 20K ROM and 5K RAM.

3. Fully expandable to 32K of user RAM.

4. Microsoft Basic interpreter as standard.

5. Accessible machine language as standard.

6. Connects direct to monitor or standard television.

7. Full size typewriter-style keyboard.

8. Full colour and sound.

9. All colours directly controllable from the keyboard.

10. 62 predefined graphic characters direct from the keyboard.

11. Full set of upper and lower case characters.

12. 512 displayable characters direct from the keyboard.

13. High resolution graphics capability built into the machine.

14. Programmable function keys.

15. Automatic repeat on cursor function keys.

16. User-definable input/output port.

17. Machine bus port for memory expansion and ROM software.

18. Standard interfaces for hardware peripherals.

19. VIC 20 is truly expandable into a highly sophisticated computer system with a comprehensive list of accessories (see panel below).

20. Full range of software for home, education, business and entertainment on disk, cassette and cartridge.

21. Books, manuals and learning aids from Teach Yourself Basic to the VIC programmers' reference guide (a must for advanced programmers).

22. National dealer network providing full service and support to VIC owners.

23. Expertise and experience — Commodore are world leaders in microcomputer and silicon chip technology.

24. Commodore is the leading supplier of micro-computers in New Zealand to business, schools, industry and the home.

25. VIC 20 is the best-selling colour home computer in the world.

How many reasons was it you wanted?

Accessories include:
- Cassette tape unit.
- Single drive 5¼" floppy disk unit (170K bytes capacity).
- 80-column dot matrix printer.
- 3K, 8K, and 16K RAM expansion cartridges.
- Programming aid packs, machine code monitor cartridge, programmers' aid cartridge, high resolution graphics cartridge.
- ROM Expansion cartridges.
- RS 232C communication cartridge.
- Memory expansion board.
- 1EEE/488 interface cartridge.
- Joysticks, light pens, paddles and motor controllers.

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A writer looks at word processors

By BRIAN D. STRONG

Microcomputers can do just about everything. Ask any enthusiastic salesperson. But being gullible machines, they can be fooled into thinking they are something else, such as a typewriter.

Word-processing software has added an extra dimension to computing activities and given computer users two machines, a computer and a word processor, for the price of one.

Choosing a word-processing package isn't as easy as it may seem as they range from very simple to extremely complex in operation. Some have a very limited range of commands and are designed for straight-forward tasks such as writing lists or personal letters. Others may have literally hundreds of editing and formatting commands available enabling the user to produce work in various formats.

Professional writers use the second type as some publications have preferred manuscript layout and unless you meet these, then it's "no sale". The advantages of word processing over hacking an article such as this out on a conventional typewriter are like comparing the steam with the jet age. I can hammer happily away at the keyboard as my thoughts occur, ignoring typing errors, missed words and carriage returns at the end of every line. When finished I can shuffle paragraphs around, eliminate stupid sentences that seemed like a good idea at the time, correct spelling mistakes and change words if I feel like it.

Gone, too, is the stress factor associated with conventional typing of having to completely re-type a whole piece over and over until it comes right. With a short article this isn't such a big chore, but if you are writing a book it can be a daunting and time-consuming task. One of the aims of all this is to present a coherent and error-free manuscript, something that can be done faster and easier with word processing.

But there is word-processing software and word-processing software. Both types have one thing in common. The advertising always speaks very highly of it. The ideal, of course, is to try it out in the store before you buy, but this is not always possible if the package is not locally available, or you have to buy by mail order. What may sound terrific on paper may turn out to be terrible in practice, but you should keep in mind that judgement of word-processing software is a subjective matter. Another writer I know who has the same system as myself (Apple II+) uses a software package that I just couldn't come to grips with. He swears by it, I swore at it.

Cost is another factor. There are some professional standard packages available at a reasonable price, just as there are some that are overpriced. There are also other factors we in New Zealand have to consider. In the case of word processors there is not a great range available, so some purchases may have to be imported.

This means that to the basic United States price is added air freight, currency exchange rates, and import duties. Even dodging wholesale and retail mark-ups this significantly increases the base cost several times. Unfortunately, writing professionally requires a package that will do many things so my purchases have often been based on as much research as possible and a large dollop of blind faith.

Because of this high cost factor I possibly expect more from some packages than they actually offer when compared with their sales presentations, but it would be interesting to know if some developers of word-processing software bothered at any stage to collaborate with a professional writer.

As I write for a range of publications and have a particular interest in word-processing software there are certain criteria I look for. First, how does the product match the advertising? Some descriptions, while technically accurate, are rather grandiose and open to different interpretations between manufacturer and user.

Another thing I look for is printer compatability, a spin-off from about three years ago when I bought a package only to find it was designed for one particular printer. A paragraph in the badly produced documentation imparted the wonderful news that if I had a different printer then all I had to do was to change that part of the program which had been made accessible. There had been nothing to suggest printer exclusivity until I opened the package.

Someone, somewhere, also assumed every purchaser could write programs. Admittedly the package concerned was presented as a word processor of modest abilities and didn't cost much, but it's the sort of "hidden factor" that should have been made clear in the sales material.

Some word processors have special features which become available only with the addition of boards, special plugs, etc. In some cases the same features are already available in another software package without the added expense of extra hardware.

I tend to think of word processors as simple, advanced, and professional, not expecting too much at one end of the scale and probably too much at the other.

My writing covers articles,

books, radio scripts, and screenplays and for these I at present use the original version of Magic Window and Screenwriter II.

Magic Window, as many will know, is a nice package and easy to use with a "what you see is what you get" capability. A big advantage it offers is that you see your actual page dimensions outlined on the screen.

Screenwriter II, an excellent package, is in a different league. With its dozens of formatting commands the same piece of text can be presented in many different ways. But for one fault it is almost a professional package, a fault that most wordprocessing software has in common, the lack of page break indicators.

For some types of writing, such as screenplays and scripts, it can be necessary at times to know exactly where your pages start and end. If certain things run from one page to another, then the following page has to carry additional information. Without any indication of where the page ends (allowing for any embedded formating commands) the user is forced to fall back on repeated print-outs and text insertions as things are progressively shuffled into place. This is time consuming, does dreadful things to blood pressure and only makes paper manufacturers happy.

Before everyone bursts into print to defend their favourite word processor, let me freely admit there are a number I have never seen or tried, and there are updated versions of some I have used in the past. These brief observations are based on reading other reviews, opinions offered to me, attempting to read between the lines of sales literature, and several word processing packages gathering dust in my desk drawer.

Interested in robots? Those interested in robots for hobby or industrial use, in general automation, etc, and who may be interested in subscribing to or contributing to a newsletter on the subject, are invited to write to Neill Birss, 21 Whitby Street, Christchurch, 5.

Wellington nuclear scientist, Neil Whitehead, who reviewed the Microprofessor in an early edition of "Bits and Bytes", now has an Osborne. He's using it particularly as a word processor. He reports on the machine, and on Wordstar his word-processor.

Good words for and from the Osborne

The Osborne 1 portable computer included Wordstar with the machine, had dual floppies, 64K core, was compatible with most printers imaginable, and included CP/M, a complex, and a fascinating program called SuperCalc for obvious tasks, two good versions of BASIC. This with 10 floppies, cost me just over $3800. It'll cost you a little more now.

It has a legendarily small screen (12cm) – perhaps they have been afflicted by the idea of micros — which produces text slightly smaller than typing, but very clear indeed. And I confess to amazement that it is quite readable, and my desire to feed it into a larger monitor has faded a lot. And I work on it for hours a night.

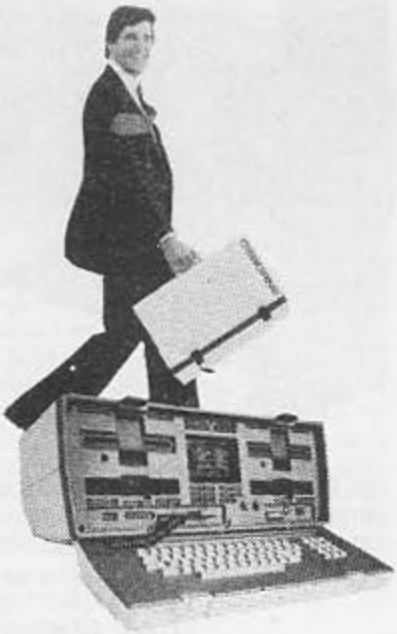
Portable? Oh, I suppose so, but really! I carried one home from DSIR once (my branch has two) and all I can say is that it's just as well I do 5BX exercises each night! About equivalent to a heavyish suitcase, and I've always hated carrying them.

I also considered the Kaypro II, which is very similar to its portability, a much bigger screen, but is about a kilobuck dearer and I doubt the wordprocessing program they give you is quite as good. You may be also interested to know that the Kaypro 5 and 10 are also portable but have 5 and 10 Mbyte hard disks. Yes, you read correctly! The prices for these are of course beyond 5 kilobucks. The present upper end of the portable market is the Otrono Attache, which has a reputedly superb keyboard, good screen, good software and makes a good hole in your bank account to match.

I see the future, however, producing very large magnetic-bubble memories. I don't think they'll be very long coming and they will avoid the problems of close tolerances and moving parts that plague present disks.

Osborne, Kaypro and Attache are touted as small business computers and I think that's fair enough.

Well, the critical question is how good is the Osborne to use? For me that depends on how good Wordstar is (I'm writing a book)



and also to some extent on general machine characteristics.

The keyboard is a geniune touch type one, and I have mainly slight criticism that it feels rather light. Do you know what I mean when I say that if I hold a key down and release it suddenly I hear a slight "ringing" sound caused by the springs under the key? It feels as if the keyboard is flimsy to touch, though I doubt it is. But really it's quite adequate for all its "plasticky" feel.

One of our machines at work has had problems with the plug connection at the back, and my machine and one work one, have had problems with BDOS errors which arise from other than stupidity. In at least one case the problem disappears with a warm up of a few minutes, and one wonders a little if the double-density floppies (about 180K bytes) have tolerences which are simply too critical.

CP/M, for the uninitiated, has an appalling feature that if disk read or write is faulty for some reason, you tend to get "BDOS" error, which often loses you lots of data, and may crash the system back to the CP/M monitor – many other systems at least give you some protective 'out'.

I have one other doubt. The catch which holds the case shut has a plastic hinge which relies solely on the flexibility of rather stiff plastic for the movable part. The ones I have seen are already white with fatigue (the hinge is black). If it fails I don't see how you'd carry the computer any more.

I admit to being already spoiled. I've used very high quality wordprocessing programs at work for years (Digital Equipment Corporation), and was unwilling to settle for less. But (of course) I still wanted that for about 1/10th the cost so I looked around.

I became a little disillusioned on my hunt. So many micros were lovely machines, but I was astonished how fast prices rose when CP/M was used and floppies included, and groaned when I saw the meagre facilities for editing and wordprocessing. I swore I was not interested in BASIC in any version, I didn't want graphics or colour, and a simple printer would be quite good enough. I did insist I wanted dual floppy disks for convenience. What did I find? That the Osborne I is very good value for money and may be even for purposes beyond mine.

Why did I buy it? For the book. Only. I thought. However, I find I'm also writing this article on it, and that's a symptom. Even with strong will to buy a computer for one purpose only, you'll still find you end up doing other things.

I should have expected it. Young relatives of various vintages insisted I produce games to entertain them, and I've even

had to get into graphics, which are possible on the machine but best described as "chunky". I fear also I'll be finally using some of the Supercalc features for some of the research for the book. How much of this is another application of Parkinson's law – if you've got something you'll use it? Perhaps there is a computer law which says if you've got some feature you'll have no option but to use it sooner or later! In that case you'd better beware what you buy! Perhaps the micros are really taking us over!

And so to Wordstar. An older program now, but still costing about $600 by itself and obviously best bought as a package with the computer. Much more sophisticated than most, except even more expensive systems. A friend told me her firm is spending 50 kilobucks on a new system. But honestly, it doesn't do a lot more than what I have here.

Wordstar is better than I expected. It is designed for use on a pretty general computer keyboard, so doesn't use fancy extra keys except 'control' and 'escape'. You have to hold the former down for almost every command – and there are dauntingly many for a start and it is obviously best for touch-typists.

'Good value for money'

Wordstar is screen oriented, so your text appears on the screen, and a cursor flits round it at your command. You can insert, delete, overtype, append, copy or shift blocks of text, search and replace named strings, and extensively format text for printing and manipulate files. It has two specially nice features.

The first is automatic wordwrap – i.e. you don't press carriage return. It works out when that should be done, shifts you to the start of a new line and fills out lines with spaces. You put carriage returns at the end of paragraphs.

The other feature is quite brilliant. If you are changing the line length a single command will reformat a paragraph for you, but it will stop if it comes across a word it thinks you could hyphenate – and in most cases it is correct. Quite a class algorithm for that one, I think.

All this may seem rather like hearts desire, but nothing is perfect, and I have a few small niggles. For my style of typing there are always some features I do repetitively and wish were commands in Wordstar. I guess everyone has different ones. Are you condemned to the eternal torment of repetition? Not necessarily, at least not on the Osborne. It has a keypad, which via a Setup program can be programmed to stand for such operations. For example, on my machine I have programmed things so that when I use my Wordstar disk and press one of the keys plus the inevitable 'control' it performs a sequence of operations to change my line

length sizes. Another brings my cursor to the beginning of the next line down without inserting a carriage return.

There are a maximum of 80 keystrokes one can share between the 10 programmable keys. They also are not restricted to Wordstar use. This really amounts to the ability to set up miniprograms within Wordstar also, and I find that very useful indeed. The main restriction seems to be that you can't do this recursively – that is, if you try to include one of the programmed keys in the microprogram of another it simply won't.

I know some word processing programs which include the possibility of setting up extremely complex subprograms. Some of the DEC editors do this, and I believe Spellbinder by software house Ashton-Tate has this also. But such programs are usually at least as expensive as Wordstar.

I also have to confess I think such sophisticated programs are much more use in the scientific setting than for writing more normal text.

What are the advantages of writing a book using a word processing system? In my case immense and almost essential. My wife is a first-class journalist with the ability to produce text ready for her newspaper on at worst a second rewrite. I can't. I have to retype and retype and retype . . . unless with a program like Wordstar I can merely correct offending bits. It saves literally hours. There is another possible way to increase your productivity with these machines, and that is to use abbreviations liberally, and get the machine to fill out the text with the full words later. If you are clever enough you could almost type in a kind of shorthand I guess.

I've actually improved my writing, too. For one type of writing I actually get the machine to search for every occurrence of some common words I should never use. I'd miss a lot of them if I searched manually. I also make it search for passive grammatical constructions. Perhaps one day I'll simply avoid writing them, but till then the computer is valuable as a teaching aid!

Important new word processor

The Bank Street Writer. For Apple II and IIe, Atari and Commodore. Available from Ashton Scholastic for $150. Reviewed by Mary Matthew.

Since the rave review in "Time" magazine, of March 14, we've been waiting to see this new word-processing package. The Apple version is now available in New Zealand and bids fair to start a revolution in English classrooms.

I was cautious about it when I first had a look at it. I'd heard that it was "very cheap" and "not really a proper word-processing program; more an educational one," so I was prepared for it to clank a bit. At first it seemed to,

Designed for use in classroom

as I was having to unlearn the cursor controls of Screenwriter II (Bank Street Writer is like Applewriter in using the ordinary editing keys), and I was aware that the "professional" programs have many features not available in Bank Street Writer.

Gradually, however, as I used the program with adults who had no previous experience of computers (English teachers at a conference called "Language Cultures Change") I became convinced that it is no toy. As I watched a local seven-year-old work his way through the tutorial program with his mother, reluctant to stop and let his older brother have his turn at the end of each lesson, I could see that it was ideal for families with computers. After introducing it to a young woman at the Crippled Children Society who plans to learn commercial word processing next year at the Auckland Technical Institute, but was finding Magic Window off-putting, I wanted it for everyone.

Bank Street Writer was developed to improve the writing skills of primary and junior high school students. Word processing packages intended for offices are difficult to use in classrooms, as students have to learn a series of codes before they can satisfactorily write, revise, save and print out text. Writing specialists at the Bank Street College of Education in New York saw the need for an easy system with on-screen prompts. The result is the first in a new generation of user-friendly writing programs which anyone can use.

Write mode

Bank Street Writer prompts appear along the top of the screen: the program starts in write mode, where you are told to "type in text at cursor". You are reminded that the arrow keys are used to delete characters, and that the escape key will get you into edit mode.

In edit mode you have a diagram showing you which keys to use for cursor movement, and are given a choice of erase, unerase, move, moveback, find, and replace functions. All of these include step-by-step directions, and are fun to play with. There is another on-screen reminder: the escape key gets you back to write mode.

In transfer mode, the options are: retrieve, delete, save, init, rename, quit, clear, print-draft (which prints exactly what you see on the screen, 38 characters wide) and print-final. The last function allows between 40 and 126 characters per line, with single, double or triple spacing, optional page numbering at the top or bottom of the page (starting at page 1 or 2), and a pause between pages.

You can type in a heading for the first page, and if you wish, you can print only a portion of your text or print one file as a continuation of another. Before printing out, you can check for "windows" and adjust each page break using the cursor keys.

Each file can be up to 1300 words with a 48K Apple, and 3200 words with 64K. The retrieve function on the transfer menu allows you to combine two

files in the work space, provided the second is not too long.

Moving block

This brief review can't convey the thrill I felt when I moved highlighted blocks of text here and there. "Cut-and-paste" stuff is far easier with BSW than with any other word processing programs for personal computers, as far as I know. On the other hand, correction of spelling or typing errors seemed slower than with Screenwriter, as you have to change to edit mode (escape key) for cursor movement. We may see improvements in later versions of BSW.

The manual is intended for English teachers, and has excellent suggestions for classroom use. It also includes a nine-page student guide which can serve as a ready reference when you are starting to use BSW, although the program is really pretty self explanatory.

If you have an Apple, Atari or Commodore, you'd be wise to have a serious look at this piece of new software. Certainly every school with an Apple computer and a printer needs to get Bank Street Writer as soon as possible.

It is becoming more obvious that schools need sets of computers soon, especially in areas where students require a great deal of help with their written English. Make it your business to let school authorities know that a tool for real educational advancement is at hand!

TK! Solver available

Software Arts creators of the VisiCalc program for personal computers has announced that its newest product, TK!Solver, is now available in New Zealand.

TK!Solver is said to be an entirely new application for personal computers. It is the first interactive personal computer program that solves business, financial, science, engineering and educational problems without programming.

The power of TK!Solver comes from the ease with which users can set up problems, vary assumptions, and display results. All the facilities needed to solve the problems are built-in and need not be developed by the user.

In addition to the basic program, Software Arts has developed TK!Solver Packs, which are designed to be used with the TK!Solver program to solve problems in specific fields such as financial management, mechanical engineering and many others.

The New Zealand distributors are Martin Spencer and Associates Ltd., P.O. Box 2502, Auckland 1.

A good machine for games

By CHRIS O'DONOGHUE

The Sord M5 is a compact home computer with nice graphics and versatile sound software. The most likely use would be for playing and writing games, though with the RAM expansion pack serious uses are conceivable.

This computer is compact and easy to set up. The keyboard is rubber with a QWERTY lay-out with the exception of a space key instead of a space bar. There is also a function key, from which BASIC keywords are easily generated, and a reset key which in conjuction with the control key acts as a break. The keys have auto repeat and there is a small tactile movement, making (for rubber keys) them surprisingly easy to use.

The top rear of the machine hinges up to reveal a bus for ROM packs, i.e. languages, games, or other specialised software; RAM pack, which can have up to 32K; or other hardware including an RS-232C communications cartridge, and a 190K 3½ in flippy-floppy drive. These goodies will be available one to three months after the release date.

At the back of the M5 are a number of sockets, power, video output, audio output, cassette I/O, RF modulated output, and two joypad input sockets. All are well labelled. The joypads are eight directional disks, which must be pressed on the edge of the direction you select.

I found these quite difficult to use, especially in one of the games supplied which was four directional. The joypads also have an attack button, which returns a 4-bit code, but I found that on the game supplied, which had two functions on the one key, there was not enough definition between them.

The cassette interface is 1200 baud, but I found that it could not handle volume fluctuations as well as some other home computers.

There are three versions of BASIC for the M5: BASIC-I (introductory), BASIC-G (graphics) and BASIC-F (floating point). Of these I tested the BASIC-I and G.

BASIC-I is a simple, easy-to-use BASIC with simple character level graphics. BASIC-G is a much more sophisticated super-set including

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unbeatable features at unbelievable Price

$795.00 32K RAM

Colour Genie is now available in New Zealand offering the home/business user a sophisticated computer with Z80 CPU and full size type-writer style keyboard, a system of immense power and flexibility at a low affordable cost $795.00

Colour Genie has as standard a massive 32K RAM–normally a very expensive extra for most home computers.

Colour Genie has considerable software already available and supports the equipment to translate the vast library of TRS 80 programmes onto the Colour Genie system.

Colour Genie comes with full colour and extensive graphics; 28 pre-defined, 128 user-definable, a total of 256 graphics set. The high speed cassette interface runs at 1200 baud which allows 15K to be saved in 100 seconds.

Colour Genie can take three disc-drives, a master with expander and 8K boot-up ROM included and two add-on drives. Each drive will be single density, 40 track with 150K Bytes formatted–a total of 450K on disc and 32K RAM on board!

Colour Genie has superb sound which connects directly to television or any Hi Fi system. The custom chip allows four arguments; channel (1-3), octave (1-8), note (0-12) and amplitude (1-15); in addition, there is also a noise "special effects" channel.

Specifications

Processor Z80, **Clock Speed** 2.2 MHz, **RAM** 32K, **ROM** 16K

Language Extended Microsoft BASIC, **Baud Rate,** 1200, **Standard Accessories** 2 Users Manuals, 1 Demonstration Tape, 1 Cassette Recorder Connector Cable

Video Video output or RF with sound modulated output. **Text Mode** Flashing cursor; upper and lower case

Display 40 characters by 24 lines. **Resolution** 160 x 96 pixels

Keyboard Type-writers style ASCII; 58-key keyboard with repeat key and cursor control keys, 4 Programmable Function Keys allowing 8 dedicated or programmable functions

I/O Ports One parallel port, one RS-232C port, one cassette port, one Video output port, one Audio output port, one RF + sound modulated output port, one light pen port, one expansion port

Optional Accessories:

EG 2012	Centronics Printer Interface with cable	$155.00
EG 2013	Joystick Controllers (pair)	$189.50
EG 2014	Light Pen	
EG 2016	Cassette Recorder	$119.50
EG 2300	Master drive, 150K	$985.00
EG 2300D	Master drive and 1 add-on drive in same case, 300K	$1595.00
EG 2310	Add-on drive, 150K	$635.00
EG 3018	Daisy-chain cable	$144.50
EG 2330	Software/Hardware Manual	
EG 602	Dot matrix Graphics Printer	$995.00

Dealer enquiries welcome

Available now at the following dealers:

Porterfield Computers Ltd
Mt Eden, Auckland

COLOUR GENIE

K'RD Video Computer Co.
Newton/Auckland

Or contact the New Zealand distributors: RAKON COMPUTERS, for details of a dealer near you. All calls can be made collect.

Rakon Computers, 9 George Street, Mt Eden, P.O. Box 9308, Auckland, Telephone 604358/600421

17 83

some fancy graphics routines. For example the CIRCLE command can draw simple circles of any radius or it can draw polygons, ellipses, pie charts, segments, and arcs.

There are also commands such as BOX, which draws a rectangle, and BAR, which draws a solid rectangle. The PAINT command fills in an enclosed area with colour, although there is a warning about donut-shaped areas, (that is, rings or toruses); the machine may hang or it may just not do it.

There are 32 levels of sprites (i.e. a sprite on level 2 will pass behind a sprite on level 1). By the way a sprite is a picture which can be treated as if it were one point; it can be moved, turned on or off easily. The sprites on the M5 are 8 x 8 or 16 x 16 pixels and can be joined to other sprites making an even larger sprite.

Behind these 32 levels of sprites is a background which can be drawn upon. Finally, there is a backlight which can be coloured.

There are four screen modes on the M5: text, GI, GII and multi-colour. Text mode can display text in an 8 x 6 matrix, allowing eight more characters per line.

GI mode is similar to text but characters are 8 x 8, allowing use of the graphics characters.

GII and multi-colour are the graphics modes. Multi-colour mode has 48 x 64 pixels, but any colours may be shown in any combination.

GII has 192 x 256 pixel, but colour is limited to two colours in any unit. A unit is a 1 x 8 block i.e.:

□□□□□□□□

I found this limitation easy to avoid when programming in the GII mode by having different colours in adjacent units.

Sound is easy to use on the M5 via the PLAY statement, there is a range of note forms (such as organ, piano . . .) available. There are three sound channels and one noise channel via an SN76489A sound-generator chip. Output is produced on the audio output channel and the RF output channel. Three note chords and a variety of sound effects can be produced.

Microcomputer Summary

Name:	Sord M5
Manufacturer:	Sord Computer Systems
Micro processor:	280A
Clock speed:	3.6 MHz
RAM:	20K
ROM:	8K monitor and up to 8K language, game, etc. pack.
User RAM:	4K and up to 32K expansion box.
I/O:	RF and video and sound outputs, cassette I/O parallel printer port. Expansion cartridge connector, 2 x joypad channels.
Keyboard:	Rubber QWERTY layout with space key, function key, and reset key.
Display:	Upper/lower case (no descenders) x 32.
Language:	BASIC-I (simple introductory BASIC).
Graphics:	256 x 191 pixels, 16 colours, two alternate screens, 32 sprite levels per screen and background level.
Sound:	Three sound channels and one noise channel, via RF output or audio output.
Cost:	Under $1000
Options:	32K RAM pack, BASIC-G (graphics BASIC), BASIC-F (floating-point BASIC), carrying case, RS-232C interface, specialist printer, joypads, microfloppy 3½in disk-drive.
Reviewer's ratings:	**Documentation:** 2 **Ease of Use:** 4 **Language:** 4 **Expansion:** 3

(Review unit from Challenge Computers)

A nice feature of the BASIC is 32-character variable names (including labels). This makes it easy to write meaningful names and labels. The BASIC also has quite good interrupt handling. The interrupt handling is of the form.

ON condition (GOSUB, GOTO)

and the conditions are ALARM, which would issue an interrupt after a period of time. It is of the form, ALARM time, then ALARM ON, or ALARM OFF. EVENT issues an interrupt at set periods. It is set in a similar way to ALARM.

KEY issues an interrupt if a key is struck and similarly with PAD, which issues an interrupt if the joypads are pressed. COINC issues an interrupt when two sprites collide.

ERROR interrupts allowing you to handle errors easily.

Another software package included with the test machine, FALC, is an information-management system which will sort, search, up-date data and then display it in easily assessable form. Because of the RAM limitations (4K) I found this only moderately useful. Perhaps the table of information can be enlarged from 8 x 60 with the addition of the RAM pack.

The documentation that arrived with the M5 was in tutorial form. There was no reference except for a small statement listing at the back. Tutorial documentation is good for learning to use the software but an index or cross reference could be handy once you have learned the language and just need a reminder on the syntax of a seldom used statement.

Summary

All in all this is a very good machine if you want to play games, or write them, but the limitations of its memory and documentation makes it unsuitable for larger scale applications — unless you purchase the extra memory.

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(May 1983 issue, Australian Personal Computer)

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Playing the Ace from Franklin

by JOHN WIGLEY

After all the fuss about Apple clones, this review has been written in the lounge of my house, not looking through the bars of a prison cell. What was all the fuss about?

Apple took exception to people who, in their opinion, were copying the Apple II plus and cashing in on their market. Some were straight copies, and some were look-alikes. Franklin as a look-alike survived a court battle. What is the Franklin like?

It's a 6502-based machine that can run 64K of memory. It will take plug-in cards for expansion just like the Apple; in fact, the same cards can be used.

But as originally received it does not run as an Apple. Load in the special disk (an EPROM will be available shortly), and then you are free to run Apple programs.

I tried a wide range of Apple programs, wrote some of my own, and there seemed to be no problem, except for a couple of games programs that used some of their own special routines. Obviously, a few addresses are **not** the same. I didn't have enough time to sort out which they were, but I don't think this would be any great hassle to an owner.

The Franklin Ace has upper and lower case built in, and a numeric keypad. So it is an improvement on the Apple II plus. At the same time as I was reviewing the Franklin the Apple IIe became available. The IIe also has upper and lower case, and the keyboard has been revised, but it doesn't have a numeric keypad. Memory has been increased, so the Franklin Ace is a sort of parallel but divergent development.

The Franklin is better than the II plus, has upper and lower case, and will expand as the IIe, which has the same improvements, with the different keyboard.

If you are used to the Apple plus keyboard and would like an improved version, or if you are looking for a computer that has a large range of software, readily available, then the Franklin Ace has to be on your shopping list, and the price is right.

The Franklin ACE 1000 keyboard includes a 12-key numeric pad, an alpha lock key and keys with special VisiCalc designations.

A few quick words for those who don't know the Apple system . . . The Franklin or Apple with one disk drive makes a very nice system. Apple DOS commands make for an easy user interaction.

Beginners seem to take to it like a duck to water. As you progress, faults start to show up, which is why other brands still sell well.

You pays your money and you takes your choice, and the Franklin Ace is a no-compromise, full keyboard computer. At the price it's a good buy.

A very fast servicing network has been established for the Franklin. Use is made of the N.Z. Courier service for a one-day transit time, and the intention is one day service with return that evening by N.Z. Couriers. This should set the standard for its competition.

Microcomputer Summary

Name:	Franklin Ace 1000.
Microprocessor:	6502.
Clock speed:	1.022 MHz.
RAM:	64K plus 16K language card.
ROM:	Monitor plus space for 6EPROM's of 2K each.
INPUT/OUTPUT:	Eight expansion slots plus joystick/paddle connections. Video output.
Keyboard:	Full-size, 72-key, including numeric key pad, PAUSE (CTRL-S) and BREAK (CTRL-C) and Autorepeat. Keys are capacitor switched.
Display:	24 lines x 40 characters. Upper/lower case. Inverse video. No colour.
Languages:	Applesoft BASIC (loaded from disk). Wide variety available: Pascal, LOGO, and many others.
Graphics:	40 x 80 VERT. resolution. 40 x 40 with 4 lines text (split screen graphics text). High resolution 280 x 192. 280 x 160 with 4 lines text (as above).
Sound:	Speaker included. Programmable sound from BASIC.
Cost:	$3950, including Disk controller and one drive, and green screen monitor.
Peripherals:	Will accept all Apple II boards and disk drives; a CP/M card with 64K will be available shortly.
Review unit from:	Selwyn College, Auckland.
Reviewer's ratings:	documentation 4, ease of use 5, language 4, expansion 4, value for money 4, support 4.

A 'cracker' VIC game

Southdown. Expanded VIC (Minimum 8K). Lab Software, 51 Te Kanawa Street, Otorohanga. $12. Reviewed by A.J. Petre.

This is a cracker of a game. It is intended for one player, but the family is bound to join in with lots of good (?) advice. It is also a game that can bring home a few commercial truths to young minds.

Southdown is a freezing works with a $2.5M deficit, and you are brought in as manager with a two-year deadline to make a profit. you are given export contracts for meat, you can select some local contracts of your own, and you get a weekly report and make weekly decisions on your way to fulfilling monthly contracts — and to making a monthly profit or loss.

Mess it up and miss your contracts, and you will end up getting fired.

First off, you have to buy stock (at prices which vary sharply) and set aside money for works repairs. Too little stock and you can't meet your contracts. Too much, and your grazing fees go through the roof. Too little on repairs, and your production is cut by breakdowns.

Then there's the union. Hiring men keeps them happy, but pushes up your wages bill. It raises the kill rate, but if you run out of stock before the end of the month, you are paying the men for nothing. Fire men, and the union is likely to strike for more wages. Wage bargaining can be protracted — and while the strike is on, production (but wages too) are at zero.

You can pay an occasional bonus to help forestall strikes and keep the men happy. Reactions range from, "Gee, thanks Boss!" to "Cheapskate", according to the size of the bonus.

Then, there's what that union man calls "the Gummint". Every now and then they're likely to spring a general wage order on you, which really messes up your wage/production calculations. Every time you give in to wage demands the wage rate — and bill — creeps higher.

Kill too much stock, and you may be able to sell it on the local market — it also can go towards next month's contracts.

After a month meat "goes off" so you can't just keep the cool stores filling up. Miss your contract, and buyers may accept the situation, or reduce your contract price, or even cancel the contract. You get monthly reports, you get taxed at 50c in the $ every March, you pay utility charges every two months, plus bank interest fees and feed costs.

Top marks for this program — it is imaginative, realistic, does not crash, and seems bug-free. Unlike so many these days, it even has the spelling right. It should go well in Australia, too. But those further afield might be a little mystified.

My rating for the tape:

Loading and instructions: very good. Colour and graphics: text and figures only. Value: Excellent. Player Interest: Excellent.

Good value for $20

Tote, High Finance, Solo Poker, Acey Deucy. Unexpanded VIC. Lab Software, 51 Te Kanawa Street, Otorohanga. $20. Reviewed by A.J. Petre.

This games tape is a good one. The start of some of the programs needs tidying, but it is good to see games for more than one player, and there is plenty of entertainment for the price. Good written instructions, and well "crash-proofed" programs, too.

Tote is a horse-race game for up to six players. Check the form and the odds, place your bets (up to two each)from your $500 purse, a starting shot, and the "horses" are off. Six numbered squares race up the green "track", off the top of the screen and back on the bottom about three times before the finish line appears. The winnings and losses are calculated, form updated, and on you go for another nine races — after which all gains and losses are shown.

Not a bad game, but players found interest palled before 10 races passed, the "horses" were graphically disappointing (it does

fit in 5K after all), the lack of "scorecard" showing players' financial positions was annoying, and a simple "clear screen" command at the start of the program would ensure that the "number of players?" prompt did not appear at the bottom of a screenful of searching/ found/loading/OK instructions.

High Finance — a stockmarket game for up to six players — has great appeal. Each player starts with $1000 and has to turn it into $1M to win. There are price swoops, bonus issues, brokers' fees, and 20 per cent interest on any overdrafts. A well thought-out game, realistic and complex enough to interest adults, and also able to hook youngsters.

Acey Deucy is modelled on the card-game: four can play, and the aim is to pick that the value of the third card you are dealt is between that of the other two. It is not hard to break the bank, and interest falls accordingly. Graphics are good.

In Solo Poker, the player gets 25 cards, dealt one at a time, and has to place them anywhere in 25 blank spaces to make up the best poker hands. You aim to make 12 hands: five horizontal, five vertical, and two diagonally, so it takes some careful thought.

More instructions in the program would help: people lose bits of paper, and when a function key has to be used, it is easy to forget, if you don't play the game often.

My rating for the tape:

Loading and instructions: Good. Colour and graphics: Good. Value: Good. Player interest: Fair to High.

Good maths series from U.S.

Milliken Maths Series, from the Milliken Publishing Co. 1980. Obtainable from the Milliken Research Company, 1100 Research Boulevard, St Louis, Missouri 63132 Reviewed by C.A. Wright, a lecturer at the Christchurch Teachers' College.

The Milliken Maths package consists of 12 disks, a teacher's manual, and a strong, vinyl-backed folder to carry the disks in. It is a good example of what can be done when sound teaching and psychological principles are followed. No commercial teaching program should ever be written without a good educational psychologist or a teacher in the programming team.

Twelve maths areas are covered: the four rules, integers, equations, percentages, fractions, decimals, measurement, laws of arithmetic, and number readiness. The total course is designed to cover the syllabus from grade 1 to grade 8, which should take New Zealand children up to about Form 3.

Each disk is designed to be used by up to 100 children at a time, all working at their own pace at individual programs (if the teacher could find time to set them up). Or if you prefer, you can organise your class in groups, each working at a different level. Each child (and the teacher) is assigned a code name to prevent people from clobbering one another's programs. The class management routines are flexible and simple to administer and enable the teacher to run truly individualised instruction in a large class without growing ulcers.

This is a true CAL package. If the child makes a mistake twice on a specific problem he is corrected immediately and led through a simple step-by-step procedure to remedy the difficulty

before going on. If he makes too many mistakes (the failure level can be pre-set by the teacher) the program automatically drops him back to an easier level and then works its way back up.

The mathematical procedures, while they are not always those which are fashionable in the New Zealand primary syllabus, are certainly compatible with it. Only one method is used for each procedure. Subtraction is taught by the decomposition method for example. So the program will not develop understanding by exposing the child to a variety of methods. However, it might ensure thorough mastery of the chosen method. The format and the methods used are ideal for slower learners and for remedial maths and, in fact, we had dramatic success with the first pupil we placed on the program. He caught up over two years in his maths over about three months of daily practice.

The manual is clearly laid out and easy to follow. One example of every level of difficulty is given. The catch is that the teacher has to set the assignments before each child can begin, but this is a small price to pay for the flexibility gained. You can set the mastery level and the failure level manually and get a detailed report on the progress of every child in the programme. In short it is a truly individualised program.

Screen formatting is attractive and uncluttered. Reinforcement of correct responses is done instantly using little humorous animated graphics sequences. You need a colour monitor to make the best use of this feature. The program has real possibilities for teaching maths to deaf children. We found the graphics were very slow "dissolving" before the next frame and felt that the sustaining of interest might have been improved by switching to a random reinforcement schedule once the intitial learning routine for each level was established. A wider range of graphics routines would definitely improve any new edition Milliken are considering.

The initial cost in New Zealand currency if you import directly is around $500, which sounds a lot until you consider that you're getting an entire primary school maths course for 100 children. The disks are write protected on track three which makes it difficult for schools to make their own back-up copies but I must say my sympathies are with Milliken when they are marketing a product of this quality. You need to consider this back-up problem before purchasing.

Summary:— The Milliken Maths Sequences is an excellent package for use either with individuals or with classes and good value for money.

N.Z. agent

E.C. Gough Ltd, has been appointed New Zealand agent for Minato Electronics, of Japan, which specialises in equipment ranging from LSI/Memory test systems to PROM programmers. It recently introduced the 1860 series of PROM programmers to its range.

IBM retirement

Mr Frank Cary, chairman of the board at IBM from 1973 to February of this year, and the corporation's chief executive from 1973 to 1981, has now retired as an employee of the company. However, he will continue as chairman of the board's executive committee.

How to wage war on bugs

by PAUL BIELESKI

Popular wisdom has it that the term, "bug," was established in 1945 in the famous Mark I built at Harvard by Howard Aitken with help from IBM. The operators of this machine were baffled by errors it was making. The problem was solved when someone found a moth in the works. The memory was in the form of electric relays (adding two numbers took a third of a second) and the bug was caught in between contact points. The moth was extracted with tweezers and still resides in the run log book.

From then, computer errors raised suspicions of another "bug" in the works and the "debugging" process was initially to uncover it. These people, and generations of programmers to follow, found it hard to accept their own fallibility and always expected "bugs" to be caused by a machine fault rather than their own faulty programming efforts.

Whatever the fault is, there is always a reason, even if you never find it. If only for mental peace, each and every bug ought to be tracked down lest it obscures other more important faults.

If you have a program that does not operate as planned, it is wasting time to presume anything other than incorrect programming. Bad data is the second most common cause of a fault, but this is far less common that programming errors.

Compiler errors and machine malfunctions are even rarer these days.

Just as programming is a mental process, so too is debugging. It can be more intellectually satisfying than programming. I know because I have done so much debugging of my own programs! My first program on an old machine never worked and it took me several years to find the cause.

The bug exists to be discovered and it requires superior skills to make use of the information available and apply the correct tools to track the bug*** down whatever its cause. Here are some hints.

The tools of trade

The skilled worker knows his tools and makes them work for him. The most important tool of debugging is called the "trap". This term now includes software traps as well as hardware traps.

A bug is stopped in its tracks by trapping some invalid operation that is attempted. This usually implies that some programming fault lies prior to the invalid request.

The classic hardware trap is made on an attempt to divide by zero, for which computer hardware does not provide.

High level software such as BASIC includes software traps for such things as divide by zero, square roots, or logarithms of negative numbers. Some faults are trapped and a message displayed on the screen. Serious faults such as out-of-bounds subscripts result in a message and the halting of the program. The careful programmer usually builds traps into his programs as a matter of course.

The "dump" is a debugging tool that is not so much in vogue now. Perhaps it is a bit crude and "messy". The first popular computer in this part of the world was the IBM 1401 which had a concealed switch known to all programmers. When operated it caused all of memory (4K-16K) to be automatically listed on the printer. This enabled the programmer to see the final values of every variable in his program and check the program for damage done by a wild untrapped subscript error.

Using a high level language such as BASIC, the programmer does not know where the variables are, so such a printout would not mean much. It is all a bit crude these days to wallow in dumps. For skilled use, the programmer can insert his own PRINT statements at the end of the program to obtain a user-programmed, end-of-job formatted dump, of carefully selected specific variables.

The "trace" is an important tool, but it needs some skill to apply it selectively. It can overwhelm the user with too much information.

The trace is usually a high-language built-in facility that is switched into use as required. Most interpretive BASICs feature TRON and TROFF which can be used as a statement within a program or as a command.

In a compiled BASIC such as CBASIC, the compile process is

HINTS

run with a "toggle" $E set. This causes the compiler to insert extra instructions into the INT module to make a trace of the program action. With only the toggle used the running program will identify the statement number as well as the cause for any trap made of an error condition.

In addition, when running the program, a full trace can be obtained with a command such as RUN PROGRAM TRACE 125,285. This will result in each of the line numbers in the range 125 to 285 having its execution logged on the screen as it is reached, enabling us to follow the program's flow of logic in the specified range. This form of trace is called a "logic trace".

An alternative form of trace called the "arithmetic trace", which few if any BASICs seem to have, requires the nomination of variables rather than statements for extra instruction creation during compilation. This trace when invoked causes each arithmetic operation on the nominated variables to be logged on the screen.

This enables the user to see the development of unexpected arithmetic results. In both cases bugs need to be localised to a specific area before use of a trace, because of the large volume of output that can be produced and has to be studied before the error can be detected.

Finally, the "spy" is a bit of extra code that the user inserts into a program to send out intelligence from within the program.

It can be in the nature of a trap, a dump, or a trace. It is important that it does not interfere with the ordinary operation of the program. It can be very selective compared with the other three tools, but it requires some skill and experience to use.

One has to have an idea of what information needs to be known before the spy is sent on its mission.

Next month: Applying the debugging tools.

LETTERS

The Apple II

Dear Sir,

I was interested to read Mike Malloy's assessment of the Australian Personal Computer Show in your June issue. I would like to make a couple of points.

Firstly, as regards Lisa I understand that the Australian price of $12,000 does indeed include 5 Mgbyte hard drives together with the six application packages.

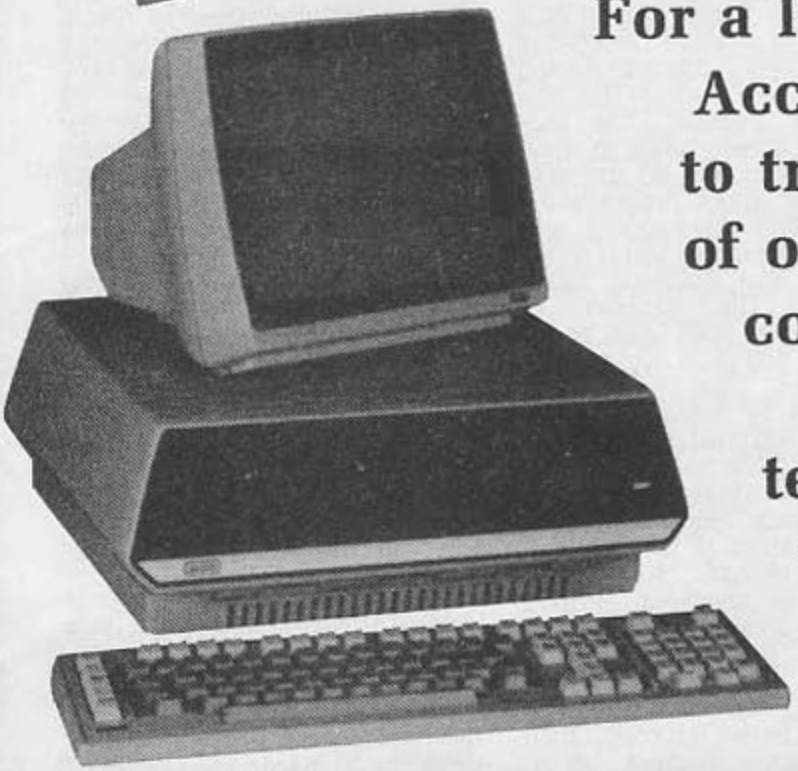
I suspect Mike's comment regarding the "boring bread and butter" Apple IIe was somewhat tongue in cheek as the Apple expects to supply its millionth Apple II (the latest version being the Apple IIe) within the next six weeks or so. The IIe is, I understand, the first computer in mass production to incorporate VLSI techniques, one of the few machines to use full ISO standard keyboard and includes many other features such as self-test diagnostics, the ability to provide one English and one foreign character set switch selectable and other features which were previously only available as optional extras on the Apple II.

It is a pity that the Apple II is boring to Mike, particularly as it has been the sole reason for Apple Computer Inc., to become the first company in history to reach $US1 billion sales within five years of commencement. It should also be noted that the Apple II is a top seller, not only throughout the world but in New Zealand where it is estimated there are 5,000 units in daily use.

For Apple Computer Inc. and ourselves "bread and butter" the Apple II certainly is, but boring - never!!

— B. Eardley – Wilmot,
Director,
CED Distributors, Ltd

TRADE BACK



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Short Circuit 3: Beyond Logo

By PIP FORER

This last brief look at overseas computing focuses on language and begins at a most unlikely but very rewarding meeting. This was the conference of the Society for Artificial Intelligence and Simulated Behaviour, held at the University of Exeter. Apart from the papers at this conference by far the most significant aspect of the whole meeting was **who** attended. Not the sparse crowd of esoteric researchers that might once have been expected by some, but a host of practising teachers and administrators from primary level upwards, many from the least numerate of the school disciplines. What had attracted them? Basically, a potentially explosive conference built around the themes of two distinct computer languages: Logo and Prolog.

One clear trend in educational microcomputing is that more purpose-specific languages are becoming available. Each does different things in different ways. BASIC was adopted as friendly and suited to small machines and has survived to become our de facto common language. Pascal has pushed in to satisfy the demands for structure in a classic scientific type of language. The list-based languages have arrived with their ability to build their own, on-going vocabulary: Lisp for early work in artificial intelligence and Forth more recently for graphics freaks. As mainframes shed their languages downward and the growing user base and capacity on microcomputers spawns more approaches to language so new names enter the arena. Logo and Prolog are just part of this process.

A Logo user's Logo

However, they represent very different aspects of computer applications, both generally and in education. Let us look at Logo first, since almost every New Zealand high school has the language available on Apples. In my earlier series on graphics I mentioned the Logo turtle as one aspect of what is a very powerful general language.

The important thing about Logo is the philosophy that underlies its development. It was set up as a language to nurture inquisitive thought and problem-solving skills. Its main medium for this was turtle graphics. The user taught the screen turtle to draw (through Logo) and on the way learnt a lot about programming and geometry. De-bugging was visual (bad drawings) and rewards immediate and aesthetic (good drawings). The process of learning these skills was to be explorative and pupil centred.

At Exeter, Logo was to be represented by Seymour Papert, its initiator and chief publicist, and Bob Lawler, both from the Centre Mondiale, in Paris (of which more). In fact, Jim Howe, from Edinburgh, stood in for Papert at the last minute, substituting canniness for charisma. Howe's careful analysis of how a flamboyant language has been harnessed to a Scottish curriculum I suspect left delegates cooler, but better informed, than Papert's acknowledged evangelical skills.

In any case Bob Lawler was there to remind us that Logo as a language has soul. Lawler is a large, generous, and enormously human American who writes regularly on Logo (see the August, 1982 "Byte") and assisted by his young daughter (resplendent in newly-acquired Lawler tartan from head to foot) we were treated to an exposition on Logo the Liberating Language. What helped enormously was that Lawler was demonstrating not just Logo but a new Apple Logo. Although other Logo's for Apple and other machines were on display, this one outshone the rest. It featured two components, one of general interest to Apple users and one just to Logo afficionados.

The first of these is that the Logo used an Apple screen with normal limits to high resolution but 16 *independent* colours. How? The answer lay in a 20cm long peripheral card with its own video signal, RAM for screen image and firmware. This will be marketed soon alone for $200 to $300, possibly under the name 'Arcade Card'.

The logo component is software providing an enhanced language that takes advantage of these new facilities. This language includes up to 16 simultaneous turtles of chosen shape, 16 sprites with precedence for display (a sprite is an independently programmed coloured shape) and a host of new commands to let you use these to create a "graphics microworld". For instance, a background can be drawn with some commands; a sprite shape can be called up and edited to look like a dog; and the sprite can be set walking across the screen. The sun (or several suns) can rise or set. For a child (and most adults) it is like a glorious, animated colouring book, with all the shortcomings and all the extensions that metaphor implies.

Three demonstrations stick in my mind. One is simply a set of "skydiver" turtles arrayed in a circle and then spiralling out, each leaving a vapour trail as he or she falls. A second was a man-shaped turtle in a maze, viewed from above. The user could program how the turtle reacted whenever he hit a wall, and from this see what decision rules allowed him to escape and which ones kept him bottled up.

The final demonstration was unreal in that it was a Logo microworld written entirely in a dialect of the Senegalese. This was a product of the Centre Mondiale, a French agency established either to a: promote the humane educational uses of computers globally; or b: bury American software brains and put them alongside French hardware (you choose a or b depending on your cynicism). The demonstration of the Senegalese microworld made a nice point about computational portability. Quite what it did for the Senegalese is harder to judge

since they were absent. So, too, were the inhabitants of the Marseilles district, who were the recipients of another Centre Mondiale project: saturation by free computers just to see what would happen! The unreal aspects of the Centre Mondiale aside, Logo captured both people's interest and affection.

In the other camp came Prolog, headed by Bob Kowalski, of Imperial College, London. Prolog is more recent than Logo and on micros much less widely available. The version we saw demonstrated worked only on the Research Machines 380-Z; this is not likely to diffuse it instantly to the world. A Sinclair version now offers greater things, at least in availability. The Japanese attach great value to its capabilities, which may well mean this limited use is a temporary situation.

Prolog is logic programming language. Unlike a language such as BASIC or Pascal, which work with numbers and files, Prolog works with symbols and relationships between symbols. If the symbols and their relationships express real-world relationships then Prolog can be used to solve problems or to find answers from a set of such relationships. One application of this is the so-called expert system where the user can interrogate a computer primed with factual knowledge about particular phenomena, for instance legal precedents. Commercial interest in such systems is strong.

The educational implications of Prolog are also quite significant. Such a language makes it far easier to program intelligent dialogue, since the computer can combine all its logical relationships to produce a wider variety of responses than were first fed in. For instance, the archetypal example of a Prolog program tells the computer certain relationships about kinship. John and Howard are the children of Rangi, and Helen and Anne are children of Howard. It also defines certain relationships such as a descendant is either a child of someone or a descendant of a child of someone. From this base Prolog can answer a query such as, "Who are Rangi's descendants?" It can generalise from the limited knowledge of parent/child in its data base to the widest lengths of ancestry through the logical conditions defining descendancy.

That may not sound an enormous feat, but try programming that in BASIC for a big data set, or more particularly PILOT. Prolog will handle it simply, and easily extend the program's capabilities. The implications for tutorial use of the computer may be considerable since, if the computer can be programmed with the relevant information to a topic, the user can expect a much more fluid response than the old "trap an answer and branch" methodology of Pilot and its peers.

In demonstration, Prolog disappointed a little and clearly its full potential awaits a more powerful machine and a friendlier user interface. One example was a "who-done-it?" based on a body found in a bog (which turns out to be a mummified, Stone-Age sacrifice). The user can ask questions about the body and Prolog replies. However, with some input questions from the audience it became clear that even this example depended rather on the questions posed being "anticipated" ones. Nonetheless Prolog impressed. Most delegates left the conference delighted by the new Logo's and quietly thoughtful about the inevitable impact of Prolog-like languages.

In terms of my short circuit that was about the lot. The one remaining experience in the U.K. was briefly running into Structured BASIC for the Apple. If anyone reading this has bought a copy from U-Microcomputers and is using it educationally I would be keen to know. Essentially, the upgrade to Applesoft resides in memory and is a transparent addition of some 32 new commands. These include procedures with local arguments, and a typical set of procedural support features such as REPEAT...UNTIL...WHILE...ENDWHILE...IF/ELSE/ENDIF. They also include features which simply verbalise certain POKEs, PEEKs and monitor CALLs (i.e. HIRES as a verb switches between High and Low resolution modes).

Also there are some new general features including a SUPERIMPOSE to merge screens 1 and 2 and enhanced error detection. Most interestingly procedures called but not in the program can be loaded in from disk during running, used, and if no longer needed removed from RAM therefore freeing the memory again. At its simplest a program could be entirely calls to procedures, all of which were on disk. As an easy path to structured programming (you simply enhance what you already work with) this approach may appeal to Applesoft users sceptical of the real place of Pascal. It will cost ninety pounds though.

So finally, back home. Los Angeles this time yielded somewhat more information as I discovered two great truths for those seeking micro magazines. The first was that the suburbs, not downtown, were the place to go. The second was that the Santa Monica bus (among many others) hides just across Sepulveda Boulevard from the airport, costs 35 cents for a seven-mile journey and runs every 20 minutes. Beware the well sign-posted airport buses at $4.60 single. A lesson here on the uses and abuses of information provision. A lesson, too, for some of our less specialist computer retailers from a Santa Monica computer store where the countermen not only knew how what they sold worked but were sufficiently interested in both it and the buyer to compete with each other with good, and often critical, advice.

Replete with magazines it was on to Air New Zealand and home. Approaching New Zealand over the blue ocean the first sight in the dawn light seemed to be The Sales Tax rising above the long white cloud.

Before you buy your first machine

By C.R. McLEOD

This month, we will look at the different ways you could go about deciding whether you could use a computer, and how to decide what to get. This subject has already been covered in previous articles, but I think some points could do with further discussion.

As is the case with any decision you have to make, it is important to collect as much information about the subject as possible. This information is usually collected from several sources, and then analysed before a decision is made. There are several sources of information about computers, and their use on farms. Some of these sources are better than others.

A great deal can be learned about computers by reading. Probably the best information in this area comes from magazines. For the best up-to-date information on hardware, and general purpose software the American and English computer magazines would be hard to beat.

The trouble with these magazines is that a fair proportion of the equipment and software they cover is unavailable in New Zealand – they are probably best reserved for having a look to see what is likely to happen in the near future.

For the New Zealand situation, you are reading the best magazine at the moment. "Bits & Bytes" has information on the hardware and software that is available in New Zealand, and as such, is the best single source of computer information in New Zealand. It is intended that agricultural software will be reviewed in "Bits & Bytes", so that should also be a good source of information.

Many newspapers now run articles on computers. Some of these articles are very good, although others should be read with some discrimination. I get the impression that some of the articles are written by the people selling the computers (this is not necessarily bad; it is just that the articles show a certain bias).

This brings us to the glossy brochures which computer suppliers present with their equipment. These glossies can be important sources of information, but they never point out the weaker points of the system (one wouldn't except them to!). By all means read these advertising glossies, but don't accept what they say as the complete story about the product, because you can bet your boots it won't be.

The same applies to the sales people in the computer shops. Some are much better than others, but because the sales pitches of some are somewhat suspect, it is best to accept what they say with caution. If you believe half of what some say you are probably believing too much. Another thing when talking to sales people, if they use terms which you don't understand don't nod your head knowingly and let them carry on. Tell them you don't understand what they mean, and ask them to explain. If you don't, you will end up knowing less than when you entered the shop. Understanding the jargon will help when you talk to these people, but if you don't understand it, that doesn't mean that you don't understand the principles involved. The salesperson should be able to explain the system to you in plain English without all the jargon. If they can't, then you are wasting your time listening.

Probably the best place to get a good basic understanding of what computers can do, and how you could use one on your farm is at

computer workshop. The Kellogg Farm Management Unit at Lincoln College runs several of these courses each year, and the Ministry of Agriculture and Fisheries has just finished a workshop at Telford (just out of Balclutha).

There may be others around the country, but these are the only ones I am aware of.

At these workshops, you will be taught the basics of how a computer works, what some of the jargon is, some programming, and get some hands-on experience of some of the software which is available. If you are considering buying a computer, this sort of information is invaluable, because you will have far more information with which to make a decision (hence the decision is much more likely to be the correct decision). Many of the advantages and problems associated with computer use on farms can only be fully appreciated with hands-on experience, and these courses provide that experience.

'Start off small'

There are many night-school classes around the country which teach computing in one form or another. These courses could be of use, especially as a way of learning all the jargon, and as an aid in understanding the general principles of a computer. Because they do not deal specifically with the on farm application of a computer, however, they would only be of a limited use.

For those people who want to buy a computer, but do not fully appreciate the use of a computer on the farm (and lets face it, that would cover just about everyone who wants to buy a computer), I would suggest that you start off small.

Before you go out and spend maybe $10,000 on a computer and software, buy a small computer and use that to teach yourself what a computer can and can't do. It may turn out that the small computer can do all you want to do, so you won't have to waste a lot of money on a bigger system. On the other hand, if after using the small computer for a while you find that you need a more powerful system, you will know a great deal more about what you want. This will mean that when you come to buying the big system, you are much more likely to make the correct decision as to what to buy.

The small computer will not have to be thrown out, it could be sold (there is a much better market for small computers than for large ones, especially if they are second hand), or passed on to the kids for playing on or learning on.

In my mind, the best small computer for use on farms is the Commodore VIC 20. This is because Primesoft has written a range of programs for this machine (see last issue of "Bits & Bytes" for details). Considering the size of the computer this software is written for, the Primesoft software is excellent. At a cost of about $3000, you can venture into on-farm computing with a system which is most useful, and which will give you a good understanding of the principles of farm computing.

If this system turns out to be too small, don't feel that you must expand the system you have. It would be much better to look at all that is available, and make a completely new decision (maybe it will be best to just expand the system you have, on the other hand that may be an expensive option).

One other source of information about on-farm computing is farmers who already have computers. They will have a good idea of the problems associated with deciding what to buy, and also they will appreciate how a computer can be used on the farm. Bear in mind that their farming system may be different to yours, and hence require a slightly different set up.

I will finish by once again pointing out that when you are deciding what to buy, decide on software before you start looking for hardware.

New farm computing service

Agricalc, a new computing service designed to assist the farmer, small business owner, community organisation or private individual who does not want or cannot afford to purchase his own computer, has been established by Ken and Janet Talbot of Governors Bay, RD 1, Lyttelton.

Agricalc is equipped with an NEC computer and specialised software from the Kellog Farm Management Unit and other sources to produce: Farm and business budgets, weekly and monthly reports, cash flow analyses, individual enterprise reports, mailing lists, circulars, invoices, stock and inventory controls, word processing and customised computing to suit individual needs.

Records can either be mailed or dropped into the Talbot's, meaning the service is available to anyone in New Zealand.

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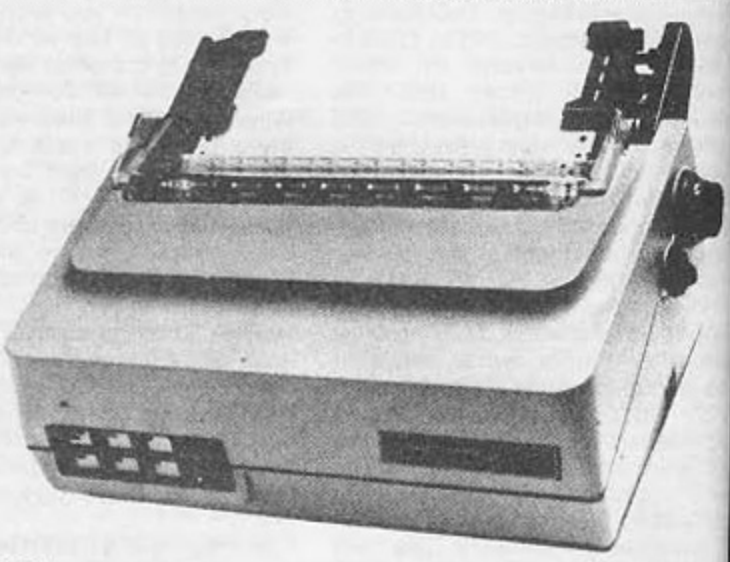
Made by the American Mannesmann Tally Corporation, this printer retails in New Zealand for $1404 plus $452 sales tax, and is marketed by Anderson Digital Electronics. The review machine was supplied by Warburton Franki.

Amazingly compact, being only 35.6cm (14in) wide by 30.5cm (12in) deep (including tractors), and 15.2cm (6in) high, the printer weighs a substantial 5.89 kg (13lb). Most of this is because of the robust, solid, cast-metal chassis. It gives the impression that it will offer many years of reliable operation in a commercial installation



The MT 160L

Both of the two versions of the MT160 have dot-graphics capability, but the L model also offers correspondence-quality printing. The normal draft-mode character matrix is 7 x 9, but for letter mode it does a second pass overprint, stepping in half-d width increments, effective using a high-density 40 x 18 d array. The print speed is 1 characters per second in dr mode, 40 cps in letter mod Character pitch can be varied: 1 12, 16.5 and 20 characters p

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Books for the buff

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Books for the beginner

Microcomputers in Plain English for New Zealanders By Brian Strong

The first computer book for New Zealanders, and the book for first-time computer users. Clear, precise and often humorous introduction to the world of the microcomputer for business people, those at home, farmers and teachers, industrial technicians and sports administrators.

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Introduction to TRS-80 Graphics Don Inman

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Basic Programming on the BBC Neil and Pat Cryer

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$7.00

NOTE: Bonus points do NOT apply to software.

Applesoft BASIC. A Teach-Yourself Introduction Barrie M. Peake

A manual for New Zealanders. It is reviewed in this issue of "Bits & Bytes". A one-book method of learning BASIC with the Apple, instead of picking information from two or three. It has model answers. Inquiries regarding terms for class sets welcomed.

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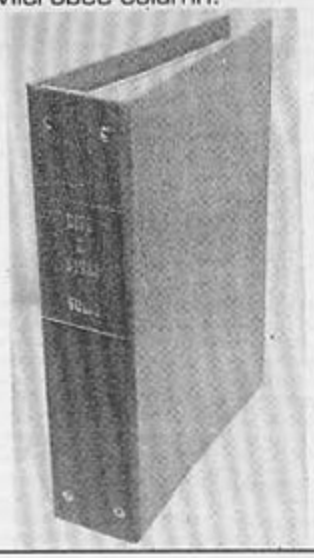
Issue No. 2 (October, 1982) is no longer available and stocks of other issues are running very low. We won't be reprinting any issues again!

To remind you here is a list of major articles in our first year's issues:

September Issue 1	What to look for in your first computer, start of series on graphics, Kellogg farm software.
October Issue 2	Start of series explaining BASIC computer language, feature on micro-computers for doctors and dentists, start of series on designing business software.
November Issue 3	Review of BBC computer and Microprofessor 1, start of series on selecting a micro for a small business, feature on microcomputers for accountants.
December/ January Issue 4	Review of Colour Computer, feature on farm computing, adventure computer games.
February Issue 5	Hand-held computer feature, review of Sirius 1 and Epson HX-20, start of farming and education columns.
March Issue 6	Reviews of Microbee, Hitachi Peach and Apple III.
April Issue 7	Review of IBM PC NEC PC 8000 and New Zealand made disk drives for System 80. New Sord column.
May Issue 8	Computers in business feature. Review of Commodore 64.
June Issue 9	Guide to farm software, reviews of Olivetti M20, Dick Smith Wizzard, Visicalc.
July Issue 10	Reviews of Spectrum, BMC 800, Supercalc, Compute Mate printer. Start of Microbee column.



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inch offered by printing in double width mode: 5, 6, 8.5 and 10 cpi. Characters per line varies from 80 at 10cpi, 96 at 12cpi, 132 at 16.5cpi, and 160 at 20cpi.

Two graphics densities are offered: 50 or 100 dots per inch, and reverse field may also be selected – a bit like inverse video on a VDU. Normal text can be underlined, and there is a subscript and superscript facility for printing one half-line height above or below the current line.

The print-head electronics gives logic seeking bi-directional head travel, a feature one expects of a printer these days. This printer also offers extensive margin control and horizontal and vertical tabulating facilities. In conjunction with margin control, the user may centre the text or align it to either margin.

Both parallel and serial interfaces are standard; paper handling facilities cover tractor-feed fanfold, roll paper and single-sheet friction feed. Both the tractor module and roll-feed assembly are easily removed and interchangeable. Paper may be fed through either a rear or bottom mounted slot. The ribbon is contained in a snap-in cartridge and quoted life is approximately 2 million characters.

Now on to one of the most impressive facilities. Hands up those who struggle with the fiddly DIL switch set-up procedures common with most printers? You will love the ease of setting up the configuration on this machine; it is all done by a question and answer menu program in the printer.

On the front panel are two

ILLUSTRATION A - Print samples

<<<<< DATA PROCESSING MODE >>>>>

MANNESMANN TALLY MT160L

MANNESMANN TALLY MT160L

MANNESMANN TALLY MT160L

MANNESMANN TALLY MT160L

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<<<<< WORD PROCESSING MODE >>>>>

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<<<<< DOT GRAPHICS MODE >>>>>

MT160L print samples

touch switches labelled YES or NO. Press NO on its own and the printer responds with a list of the current configuration.

Pressing both switches together causes it to enter an interrogative self-programming mode, each question requiring only a YES or NO answer.

The resulting configuration is retained in non-volatile memory until next altered. With the exception of the communications options, the other parameters may also be changed by the host computer sending the appropriate groups of control codes.

In practice, it turned out to be the quietest dot-matrix printer I have used. At 160cps, lengthy program listings were quickly finished, even on the 1200 baud serial interface. Not having a compatible parallel plug, I was unable to use that option. I spent a full day using the printer to prepare documentation for a system at work, and the finished product, printed in letter mode, was equal in appearance to the original typed specifications.

Using both fanfold and single sheet paper, I have only one criticism of the paper-feed mechanism. For single sheet friction feed, the opposing rollers are an integral part of the hinged plastic tear-off bar. I found that if I positioned the sheet of paper such that the top was fairly close to the print head and therefore underneath the tear-bar, the sheet quite often jammed against the underside of the bar when the first couple of line feeds were actioned. To avoid this, the sheet had to be placed fairly high (first print line about 5cm-2in down). This was not a problem when using single sheets attached to fanfold backing.

The user manual is quite sufficient to enable anyone to make use of all the facilities offered by the printer. It would, however, benefit from a more detailed chapter on using the dot graphics facility, with more examples.

Over all, in the seven days I had the printer, I could find only the one minor problem: the single sheet feed snag as mentioned before. This printer performed faultlessly. My only regret is I cannot afford to buy one for myself.

Computer cuts typing bureau costs

By CATHY ARROW

What do you do when the typewriter needs replacing and the debtors-processing machine is virtually beyond repair? To Heather Jackson, managing director of Copy Office and Personnel Services, of New Lynn, Auckland, the most sensible and economical solution was "buy a microcomputer".

"Choosing a computer," says Heather Jackson, "took time and research." Six machines were investigated in depth, before she decided on an NEC PC 8000, with 64K memory, 5¼in, double-sided, double-density disk and colour monitor.

She chose a Diablo daisy-wheel printer to enable top quality presentation for her clients.

Work the office undertakes includes letters, specifications, reports, catalogues, tenders, quotes, minutes and general public typing. "Wordstar" was therefore a very important part of her purchase from Software Architects, of Parnell.

On installation of the system, Heather Jackson's first job was a 12-page price list. This, she believes, helped her become familiar with operating the machine and to use the Wordstar program comfortably.

Heather Jackson has discovered a computerised system does lack two features which those familiar with typewriters tend to take for granted: a numerical key for representing "half" and "one and a half" line spacing.

Advantages to clients now that she has changed to computer are cost savings, greater flexibility, and convenience.

The most expensive task is the initial keying in. Storing of information for repeat projects such as price lists and catalogues enables quick updating as the product description often remains and only minor price changes are made. This results in the client obtaining a faster and cheaper service.

Everything going through is registered and left on disk for a few days before deletion. This allows customers to get another copy of a letter or document; either in original format or with alteration to name, address or relevant information.

Clients cover a wide range of business people, all with varying needs. Many use technical terminology and some have interesting handwriting. Thus the ability to insert a variable when typing from notes and have the computer program search and replace when the correct word is confirmed by the client is a real advantage.

In pre-computer days an error meant the retyping of the document, or waiting for correcting fluid to dry. The time saved now by easy correction is considered one of the greatest assets.

Heather Jackson feels the computer could also enable top efficiency from younger, less experienced operators.

"Although it could teach a school leaver terrible habits," she said with a laugh.

When buying the system Heather envisaged returning to debtors work for clients. She also intended to visit local businessmen to familiarise them with form letters (letters with the same text but addressed to different people) which are easily produced on a computer system, with the other office services the company offers.

Neither of these projects has yet been undertaken as the firm has been inundated with word processing. It is hoped that, in time, the debtors ledger package bought with the machine will be fully used beginning with the general ledger for the office being set up soon.

Heather Jackson confesses that since the installation of the machine she has become very much an owner operator in the business and with another operator almost fully trained the system is in constant use.

The story of CP/M

by JOHN WIGLEY

Mainframe computers in the early days, apart from their size and cost, had one thing in common: very little memory. They could store things on tape or hard disk, but actual RAM or core memory was limited.

To make the best use of this, methods were developed to ensure that the data could be switched into memory from storage tape or hard disk, and then worked on, restored, and some other process then took place, the results were stored, and the first data altered, and so on.

A lot of theoretical research had been done into the most efficient ways of doing this — a fact that seems forgotten now.

All of this pushing and shoving and getting and fetching and storing gets complicated; what's needed is an **operating system.** That's exactly what the mainframes got. With the prices of the early mainframes a little bit of extra expense for a system made sense.

It wasn't long before the operating system became very sophisticated and very expensive. Enter the smaller computer, sparked off by Intel and its microprocessors, the 8008 and the 8080, and then the MITS Altar 8800 microcomputer.

Now we have a very primitive computer: small with limited memory. The cycle repeats itself and the only way to push and shove data, fetch it, get it, store it, process it, etc., is to get a system.

Mainframes have them, but by now they have grown and the mainframe operating system would not fit on the puny small computer. Enter Gary Kildall (now head of Digital Research). Using the Intel development system as a base, he came up with an operating system. So did other people. But his system was different. It appealed to the owners of these new small computers — programmers and technicians.

So the mainframe programmer had a system to use on his toy; a system to develop programs. So programmers wrote programs for their toys and they wrote them with CP/M.

CP/M stands for Control Program for Microprocessors.

All computers handle files. Programs are files, data is files, and so on. To get these files in and out we need an input/output system: in fact, the Basic Input/Output System (BIOS).

Remember this is way back in 1975, and there is the console (teletype to you). We are using TT machines with keyboard input and printer output; we don't have glass teletypes (that is, visual display units). Thus we have the Console Command Processor (CCP).

Now Gary Kildall wrote a very simple, primitive, disk operating system for the 8in floppy disk drives then becoming available and being used on mainframes. So the Basic Disk Operating System (BDOS) was born.

Remember that users were principally mainframe types used to disks, even if they were hard disks. They knew how to use BDOS.

Anyway we can now through the CCP get the BIOS to call the BDOS to load a progam into the program area which is called the Transient Program Area (the TPA). It is almost a system; but how do we start it up. Before we look at this, let's look at memory.

Remember that in 1975, most computers had 4K of memory; CP/M requires at least 16K. CP/M is set up so that you set it for the memory you have available, starting at the top.

Let's put BIOS in, say: 1.5 K BIOS; then say 2.5K BDOS, and say 0.5K CCP. The rest is TPA and this expands as we expand memory. Well, not quite, as we have to set it up properly and 256 bytes are reserved at the bottom.

In machines such as the TRS80/System80 or the Sorcerer, the computer is forced by hardware to a power-on jump to the monitor. This loads the first sector of the CP/M disk. Yes, you need the CP/M disk: without it, no CP/M. This then loads CCP, BDOS, and BIOS. Now everything is ready.

What are the advantages of this? CP/M works on any memory size: 16, 32, 48, and 64K.

Tracking files

The next thing to look at is the filing system. Each file is given a name which consists of two parts: the name and the type of file, e.g., "BIGFILE.BAS". Now BIGFILE is the name and BAS, in this case is short for BASIC, is the type of file.

Each file is stored as 128-byte block records on disk. Where the records are stored is unimportant

Turn to page 57

CalcStar — a spreadsheet that interfaces with other programs

BY PETER BROWN

Users with CP/M have the advantage of being able to choose from a wider range of software packages than those who can only choose from packages specifically written for their particular machine. CalcStar (a product of MicroPro International) is one of the options they have.

CalcStar is an electronic spreadsheet program which can be used on most popular makes of microcomputer, provided they have CP/M.

Electronic spreadsheets are 'number-processing' programs designed to turn your computer into a calculating, planning, and forecasting tool. Properly used, and understood, they are an invaluable aid for keeping your business competitive.

Your computer's memory becomes a giant sheet of squared paper, with the VDU being a 'window' onto a small portion of the sheet. The 'window' can be moved around to see any part of the spreadsheet you want.

With practice, you will be able to construct models of most likely outcomes of any business decision, as well as a few unlikely ones. You can then 'play' with the numbers until you find what decisions produce the most satisfactory result.

Electronic spreadsheets are especially useful in taking the work out of preparing routine financial reports, balance sheets, cash flow forecasts, and budgets. They remove the need for pencil, paper, and eraser, letting you produce the finished report in a fraction of the time (and effort!).

Always leaving you in complete control, electronic spreadsheets simply take the drudgery out of calculating, erasing and recalculating figures — leaving you free for the creative thinking you should be doing about the structure of the problem you're trying to solve.

CalcStar is one of the more interesting spreadsheets I've come across while researching these articles.

Like all spreadsheets, it has the basic arithmetic functions of addition, subtraction, multiplication, division and exponentiation.

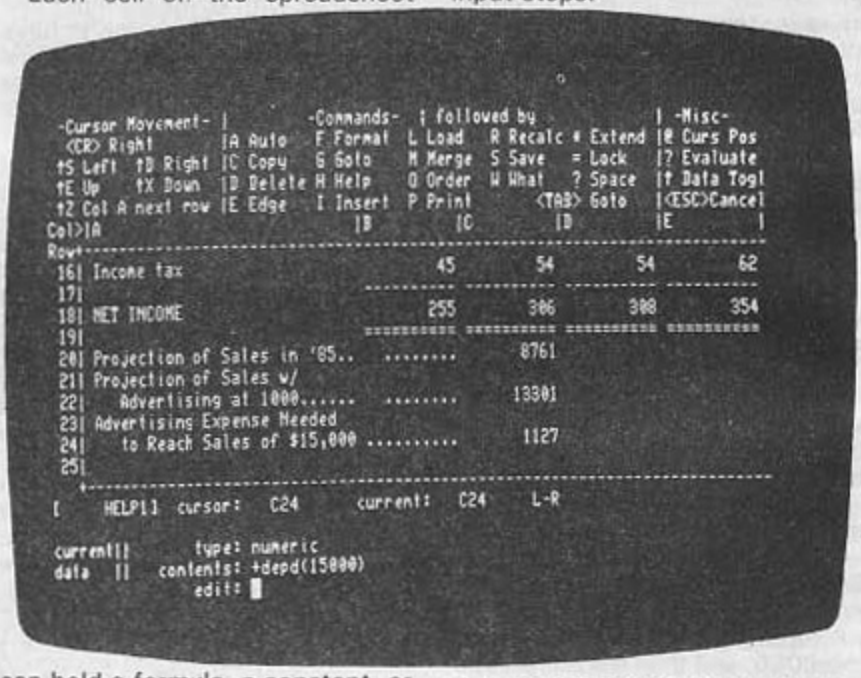
Each cell on the spreadsheet can hold a formula, a constant, or a label, and it is possible to lock titles and headings into place so that you can easily identify the row or column you are working with.

Once finished, your report or model can be saved on disk or printed out for inclusion in reports and letters. Explanatory comments can be added during the printing process.

One group of functions not found with CalcStar are the trigonometric functions. This greatly reduces CalcStar's usefulness for other than business and financial work. It would be of only limited use in engineering applications, for example (unlike some other spreadsheets). There are also some financial/economic applications for which trigonometric functions may be useful.

CalcStar does, however, have some very worthwhile features that compensate for this.

One is called Automatic Form Mode, whereby you can pre-format the worksheet for data entry so that staff can enter routine updates to the worksheet without any danger of their accidentally changing or destroying your model. The cursor is taken automatically from one data entry location to the next, according to a pre-set series of input steps.



A typical CalcStar screen display

With CalcStar it is possible to merge two or more work files, or even parts of files, into the current display.

This allows you to create little modules, for specialised tasks, and then to "mix 'n' match" them to produce a wide variety of different combinations of worksheets and models for reports, etc. The only real catch is that you must be sure that any formulas in the modules you are merging reference locations internal to that module only. (Otherwise your results will be quite unpredictable.)

CalcStar also has facilities to

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perform logical operations on data, to alter the order of evaluation of formulas in the worksheet, to vary the decimal precision of results, and some sensible defaults for the many commands.

There is a linear regression function so you can use historical information to accurately forecast the future. This is very useful in the right hands, but novices should be a little wary. (In real life the relationships between data — if relationships exist — are not always conveniently linear.)

Perhaps the one really significant feature of CalcStar is the ease with which it interfaces with other packages from MicroPro.

There are dangers in being tied too much to one software supplier, but it can be pleasant to be able to use your work, created with CalcStar, as input for a word-processing program (WordStar), a data base management system (InfoStar), as well as sort programs and mailing-list managers. It can also be interfaced with BASIC programs.

These advantages make CalcStar a powerful tool for professional and skilled users.

CalcStar is even less suitable than other spreadsheet programs for inexperienced or nervous computer owners.

Even those who are prepared for the complexities of CalcStar will have to spend a considerable amount of time learning to use the program, and they should not expect very much help from the manual.

The documentation provided with the software earns no points at all. While it seems all the necessary information is included, the layout and style of the manual is cluttered, confusing, and so unclear that it is a major effort tracking things down.

There are no photographs, no diagrams, and no colours (other than black), to break up the pages of closely-typed text. Even the sample screens are presented in the same style as the explanations that go with them.

All in all, it's monotonous, boring and unlikely to be read by any but the most dedicated. Much as I liked this package, I'm not so enthusiastic that I would want to have to cope with the layout of the manual every time I needed to look up the syntax of some obscure command.

However, if you have the patience, and certainly if you already have other MicroPro programs you want to integrate into with a spreadsheet — perhaps to create a complete information-processing system — then CalcStar is worth considering.

The version reviewed here (1.2) was supplied by MicroAge and retails normally for $380. A CalcStar version 1.45 has recently become available.

Software Summary

Program: CalcStar.
Made By: MicroPro International Corporation Inc., USA.
NZ Agent: MicroAge, Christchurch.
Hardware Required: All popular micros with CP/M. 80-column screen with addressable cursor. Two floppy disk drives (or one floppy disk with hard disk) recommended. Minimum of 48K RAM required (version 1.2).
Uses: Cash flow analyses, budgets, business planning, financial modelling, sales reports, etc.
Price: $380.
Documentation: Bad. Everything is covered but in such a way that you're discouraged from looking.
Ease of Use: Good if you can get the hang of it. Only worthwhile if you need the particular facilities offered.
Facilities & Functions: Excellent and extended range of functions and operations.
Value for Money: Excellent.
Other Comments: Poorly documented, complex, but powerful spreadsheet especially suited for use by specialists in financial modelling. Interfaces readily with other MicroPro packages.

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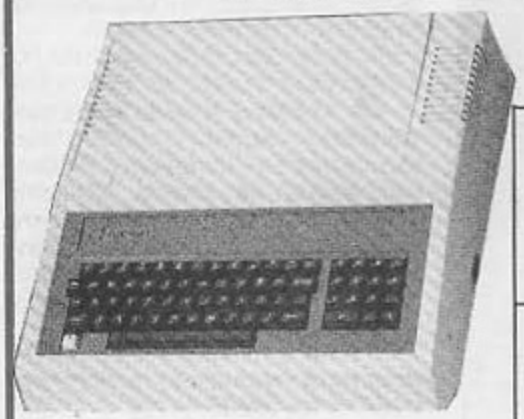

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Steps of program design

By GORDON FINDLAY

This is the tenth article in this series and the previous articles have covered most of the BASIC language, with the exception of graphics, sound, and other machine dependent (but interesting) aspects. The difficulties people have with programming are not usually with the details of the language, but with designing the program in the first place. There are a few things that I can write about, but most of the skill of designing a program comes from experience, which is just a polite way of saying, "comes from seeing it done before". To design a program formally requires five steps.

1 First, the programmer must decide exactly what the program is to do. No half measures — exactly what is to happen in every possible eventuality. As a slightly gruesome example, a payroll programmer might well worry about what should happen if an employee were to die, after his pay cheque had been computer-printed, but before he was paid. A games program must be able to handle the situations where a player tries to make an illegal move, or tries to cheat, or just makes a typing error.

2 Next, the programmer must find a method by which the program can take whatever goes in — data, information, player's commands — and do whatever it is that must happen. If the command to "move a ship left" is given, the programmer must have a method in mind or on paper for doing so. If income-tax returns are to be computed, the programmer must have, or obtain, the method for computing the various amounts required. Just as he must cover every eventuality in the first step, the programmer must cover every eventuality in this step, as well.

3 This step is to do some hard thinking about the "data structures" involved. "Data structures" is just a 30-dollar phrase meaning, "what must the program keep track of, and how will the program refer to each piece of information it is given or works out". Before coding, I recommend making a list of all the important variables which will need to be used.

As an example, in a game such as "Space Invaders", some of the things that the program needs to know are:

- The score so far;
- Top score so far;
- How many ships the player has left;
- When to award an extra ship;
- The number of "invaders" on the screen;
- Their positions;
- Which direction they are moving in;
- The rate at which bombs are being dropped;
- Whether the player is firing;
- The whereabouts, and state, of his "bases".

This is a very large example,

and I have just listed these as they come to mind. The important thing is that the actual listing makes it less likely that one of them will be forgotten! Also decide which , if any, can be handled in arrays — the trouble involved in using an array is almost always worth it.

4 The next step is to do the coding. There are all sorts of ways in which you can tackle this. There is top-down, and bottom-up, programming; there is the "start in the middle and work out" approach, the "start at the beginning and work to the end" method; and many others. In fact, I doubt whether any programmer ever uses just one of the techniques which are written about. Most of us use a mixture, and it isn't until you've done quite a lot of programming that you can tell the difference anyway. My only suggestion here is that almost all BASIC programmers do not make enough use of subroutines, and that using them will make your programming much more manageable in three ways — you can use subroutines repeatedly; they are shorter and therefore easier to write; and debugging becomes much easier when each bug is fixable (usually) in one localised subroutine.

5 This step (which can easily become the sixth, seventh, eighth and so on!) is test, debug, and test again. This is, for some programmers, the least fun. For others, it is the most enjoyable part, and it becomes a game against the machine. One thing is certain — a programmer who hasn't had to do some debugging hasn't ever written a program!

I don't want to make this sound too formal. After all, most of us are programming at least partly because it is fun. The five steps are not so separate really; often they overlap, and most may be done mentally. But the best piece of advice I was ever given was, "Don't program at the keyboard." I often do, and often wish I hadn't!

Let's try an example. This is an unexciting program, but I hope it will exemplify the attack above. We will construct a program which is to input a child's choice of a multiplication table, and run through the table, checking the user's answers. If the child asks for the "six times" table say, the computer will respond by asking "6 x 1", and letting the child type in the answer.

First step:— specify exactly what is to happen. Here goes, in a more formal way than would ever be used except in print:

1. Get, from the user, the multiplication table to be tested.
2. Ask a series of questions. As each is asked, allow for an answer. If the answer is correct, print, "Well done!". If it isn't, give the correct answer.
3. Once the series of questions is finished, give the number of questions answered correctly.

Is this an exact specification? Of course not, otherwise I wouldn't have asked. Here are some missing details:

Where do the questions appear on the screen?

Does each question replace the one before on the screen, or appear underneath?

What questions anyway? I suppose we have been mentally thinking of "1 x 6", "2 x 6", and so on, up to "12 x 6".

Let's revise the specification:

1. Clear the screen, and print a welcoming message.
2. Ask for the multiplication table to be tested.
3. Ask 12 questions, from "one times" to "12 times". Each question is to be printed on the third line of the screen, replacing the previous.
4. After each question is presented, get the user's answer. If it is correct, print, "Well done". If it isn't, print, "Sorry, the answer is", and the correct answer. Wait two seconds between each question.
5. Once the questions have all been asked and answered, the screen is cleared, and the number of correct answers displayed in the form: "You answered ..... questions correctly".

The things that the program needs to keep track of are (I've given them names):

TB — the multiplication table being asked;
X — the other number in the question "TB x X";
CT — the correct answer;
AN — the user's answer;
SC — the score — the number of questions answered correctly.

I've done all the hard work! Over to you now. Next month I will finish this program, and try to explain how I go about it. In the mean time, you try, and see how you get on.

"Get any Key"

By PETER ARCHER

One of the commonly used routines in BASIC programming involves the computer displaying a message or a screenful of text or instructions, and then waiting for the user to indicate he/she is ready to move on to the next part of the program.

Programmers often do this by using the "get any key" routine. For instance, Commodore machines (VIC, PET, 64 and CBM) use a variation of:

```
100 PRINT "HIT ANY KEY TO CONTINUE"
110 GET A$ : IF A$ = ""THEN 110
```

Other Microsoft BASIC machines use similar routines.

When the program reaches line 110, the machine looks for an input of a single character from the keyboard. If no key has yet been pressed and the character being "got" is therefore a "null" (i.e. there is no real character in the keyboard buffer, indicated in the program listing by the empty quote marks and not to be confused with quote marks with a space between them which indicates the use of the space bar), then the program keeps looping back to the start of line 110.

This will continue until the computer detects the presence of a real character as A$. The program will then run on to the next line.

Other ways —There are numerous alternative ways to halt program execution until the user is ready to continue. The "get any key" routine does have the advantage of not being too machine specific. It will work on all Commodore machines and on some other brands too. But there are also more elegant ways.

One of the least used BASIC keywords is "WAIT". Most people avoid it because they cannot understand the complex way it works — and the usual explanation in manuals and textbooks certainly doesn't help. However, a full undertstanding is not necessary to its successful use in your programs.

A useful alternative to the "get any key" routine uses the WAIT function this way:

```
100 PRINT " PRESS ANY KEY TO CONT. " : POKE 198,0
110 WAIT 198,1 : POKE 198,0
```

Location 198 on the VIC and C64 holds the number of characters in the keyboard buffer. (On the PET, the 198 should be changed to 158). POKEing 198 with zero sets to zero the number of characters present in the keyboard buffer; and the first part of line 110 then has the computer "WAIT" until there is one present again, ie a key has been pressed.

Clearing the keyboard buffer out again with another zero POKE is a good practice to prevent an unwanted character lurking there, waiting to foul up a subsequent part of your program.

Specific keys — There may be times when you feel it is desirable to require one specific key only to be pressed before the program will continue execution.

This is an elegant way of waiting on the press of either "shift" key:

```
100 PRINT " PRESS SHIFT TO CONT."
110 WAIT 653,1 : WAIT 653,1,1
```

When the computer's BASIC interpreter reaches line 110, it will cease all activity and just wait for the press of the shift key. Any other key presses, etc, will be ingored. In line 110, the "WAIT 653,1" awaits the press of the shift key and the "WAIT 653,1,1" awaits the release of the shift key.

Peek — A good way to have the computer wait until the press of any key you like to specify is to use location 203 on the VIC and C64. Memory location 203 always contains a number which is different for every key on the keyboard and changes whenever a key is pressed. This routine awaits the press of the space bar:

```
100 IF PEEK (203)<>32 THEN 100
110 POKE 198,0
```

To page 44

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Getting software for the 64

By STEVEN DARNOLD

Since writing my review on the Commodore 64 for "Bits and Bytes," I have received several letters from new owners, asking me for information on software. I have answered each letter individually, but some of my comments may be of interest to other readers of this magazine.

Like most new computers, the Commodore 64 has arrived in New Zealand nearly naked. So far there is little in the way of software available here. This, however, is not the case overseas. All sorts of programs are available for the 64 in America, and the number is increasing at an impressive rate.

CONVERTING PET PEEKS, POKES AND WAITS TO THE 64

40-53	pointers: change to 43-56.
141-143	clock: change to 160-162.
144	POKE 144,88 disables stop key: change to POKE 788,52.
151	PEEK 151 is used to see which key is held down (255=none): change to 197 (64=none) — key values are different from PET.
152	shift key: change to 653.
158	number of characters in keyboard buffer: change to 198.
166	similar to PET 151: change to 203
167	POKE 167, 0 turns on cursor: change to 204.
623-632	keyboard buffer: change to 631-640.
634-1017	cassette buffers (machine code is often POKEd here): the 64 has space from 820-1019.
32768-33767	screen memory (see article).
59464	POKE 59464 plays note (1=high, 255=low): (see note below.)
59466	POKE 59466 sets octave (15=low, 85=high): (see note below.)
59467	POKE 59467, 16 turns on sound (0=off): (see note below.)
59468	POKE 59468, 14 sets lower case mode (12=graphics): change to PRINT CHR$(14); (142=graphics).

NOTE: converting sound commands can take a long time. Leave these POKEs until the rest of the program is working perfectly (they have no effect on the 64).

Commodore 64 owners in New Zealand should seriously consider acquiring programs direct from America. It is not difficult. Most American mail-order firms accept VISA card numbers in payment. I have used my VISA card several times in this way, and the charge shows up on my monthly VISA account in the usual way. Be sure to specify air mail in your order. It costs only a few dollars extra for most items, and it could save you five months' waiting for sea mail.

If you are going to order programs from overseas, you first need to know what's available. A good source of information for the Commodore 64 is "COMPUTE!" magazine. It is available on most New Zealand magazine stands, and it carries a lot of Commodore advertisements. The only problem with "Compute!" is that it's already four months out of date by the time it gets here.

I subscribe to "Compute!" by air mail, but it's a bit expensive for the ordinary user. However, "Compute!" has recently launched a new magazine called "COMPUTE's Gazette", which is solely about the Commodore VIC-20 and 64.

The air mail rate for 12 issues is only $US45. This is nearly $NZ70, but that is what you would pay for 12 issues of "Compute!" at the local bookshop.

I highly recommend "COMPUTE's Gazette". Not only does it have the latest advertisers for 64 software, it has news, reviews, programming tips, program listings and a children's column. The address is "COMPUTE's Gazette", P.O. Box

961, Farmingdale, NY 11737, U.S.A. Send a VISA number (and expiration date) or a bank draft.

Another good source of information on the Commodore 64 is the Toronto PET Users' Group. TPUG started out several years ago as an ordinary local user group, but it has grown beyond all expectations. It now has over 6000 members in 32 countries. For $US30 you receive a monthly magazine (the TORPET) and access to the club library of thousands of public domain programs.

Members are constantly contributing new programs to TPUG, and each month three disks of programs are compiled: one for the PET, one for the VIC and one for the 64. The quality of the programs is variable; but the utilities, in particular, are excellent. The address is: Toronto PET Users' Group, 1912A Avenue Road, Suite #1, Toronto, Ontario, Canada M5M 4A1. They do not accept VISA.

A New Zealand source for the TPUG programs is the Nelson VIC Users Group. NVUG is an associate member of TPUG and is acquiring all of its Commodore 64 programs. Membership of NVUG is $10 and there is a small copying charge for the programs. The address is Nelson VIC Users Group, P.O. Box 860, Nelson.

Another good source of programs for the 64 is the PET. If you know of a local PET owner, it's well worth while making friends with him. Most PET BASIC programs can readily be adapted to the 64, particularly if your PET friend has a Toolkit, POWER, Basic Aid or similar utility with a FIND command. Do a FIND for PEEK, POKE, WAIT, SYS and USR. If there are none, the program will work perfectly. If there is a SYS or USR, the program will probably crash, and you'll need to know machine language to fix it.

PEEK, POKE and WAIT all refer to memory locations which differ between the PET and the 64. Changing them usually takes about five minutes. See Table 1.

Some of the PEEKs and POKEs will probably be to the PET's screen memory (32768-33767).

Setting 64 to match PET's screen memory

```
POKE 56,127 : CLR
POKE 56576,149 : POKE
53272,4
POKE 648,128
POKE 792,116 : POKE
793,164
```

The first line lowers the top of memory to make room for the screen. The second line moves the screen. The third line tells the 64 where it is to PRINT (on the screen, of course!). The fourth line disables the RESTORE key (otherwise, a RESTORE will mess up the screen).

There are two ways to handle this. If there aren't too many, change them to the 64's screen memory (1024-2023). Otherwise, change the 64's screen to match the PET's by adding a new line to the beginning of the program. See Figure 2.

One final problem is that the PET POKEs to the screen have no colour. They will probably be invisible on the 64. You can solve this by adding a POKE to the colour register (55296-56295) for every POKE to the screen. However, this may take some time if there are a lot of POKEs. It is much simpler to POKE the colour registers all at once, immediately after the screen is cleared (or scrolled). For example, to make all POKEs to the screen white, use this routine: FOR I=55296 TO 56295: POKE I,1:NEXT.

The above steps should make most PET BASIC programs available to users of the 64. Add to this the numerous programs advertised for the 64 overseas, the programs available from TPUG, and the program listings in "COMPUTE!". Clearly, the Commodore 64 owner has plenty with which to clothe his naked computer.

VIC

From page 40

Thirty-two is the contents of memory location 203 whenever the space bar is pressed.

Other keys will put different numbers into location 203, of course. There are tables giving these in both Commodore's "VIC Programmer's Reference Guide" and the book, "VIC Revealed".

But it would be a useful and instructive exercise to make up your own table of the contents of location 203 by using this simple routine:

```
100 PRINT PEEK (203)
110 GOTO 100
```

Run this little program, and note the contents of location 203 for every key you press.

There are many other variations of the routines listed. Don't be afraid to experiment at the keyboard to discover some of them for yourself and then use them in your programs.

The wars

For those of you who don't get "Time", a recent issue reported on what it called the Hardware Wars, with Commodore 64's retailing for under $US200, and Timex Sinclairs for $US29.97 each. The TRS80 Color Computer is selling for under $US200.

APPLE

Creating shape tables

By DAVID WHITAKER

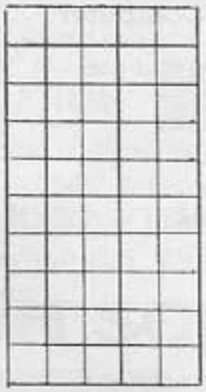
Anyone who has read the Applesoft Programming Manual (pp92–100) on the procedure for creating shape tables will have noted the inherent difficulties. Each shape plotted involves three stages: deriving a series of 'plotting vectors' for a given shape; coding the plotting vectors in binary; and finally recoding the binary to hex. Since each shape plotted is defined by numerous vectors, the task of setting up, say, the set of 95 characters which make up the upper and lower case symbols for writing on the high resolution screen is very laborious indeed. This article outlines and provides a program that takes the agony out of shape table creation.

The Shapes program is written in Applesoft BASIC and a shape table is created and stored in memory by simply drawing the required shape on the high resolution screen using the keyboard.

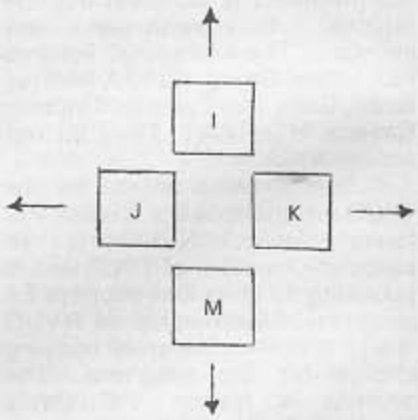
Listing 1 shows the initial interaction with the user where the number of shapes to be plotted and the grid size for drawing each shape is designated. Note that 'fineness' defines the size of the mesh and the product of width or height and fineness should never exceed the dimensions of the high resolution screen, 280 by 160 respectively.

Plotting a shape starts at the elected co-ordinates, which in the case of Listing 1, is the top left-hand corner of the grid as denoted by the dot. Shapes are plotted by moving the dot about the grid with the use of seven keys. The keys, I, K, M, and J cause the dot to move up, to the right, down and to the left respectively. These keys are in keeping with the Apple editing moves with the difference that it is unnecessary to use the ESCAPE key.

LISTING 1



```
NUMBER OF SHAPES?2
GRID SIZE (WIDTH, HEIGHT)?5,10
FINENESS?15
START OF PLOT?1,1
```



Movements can be made with 'plot on' or 'plot off' according to which of the keys 1 or 0 was last depressed.

[1] plot on

[0] plot off

Two other keys are used:

[E] to end a shape

[◄] to delete the previous plot

The latter seven keys provide the means of plotting any shape on the grid. If other keys are pressed or the dot attempts an illegal move then the Apple beeps and the dot remains as it is. In particular key I with plot off cannot be pressed twice in succession. This is because a hex code of 00 may result which ends the shape definition prematurely.

As an illustration, the moves of Listing 2 define the letter T.

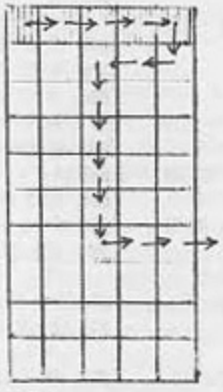
LISTING 2

Action	Key-Presses	Action
sets to plot on	1K	moves to right
	K	moves to right (still plotting)
	K	
	K	
	M	moves down (still plotting)
sets to plot off	0J	moves to left
	J	moves to left (still not plotting)
sets to plot on	1M . . .	moves down
	M	moves down (still plotting)
	M	
	M	
	M	
	K	moves to right (still plotting)
sets to plot off	0K	moves to right
	K	moves to right (still not plotting)
	E	ends the shape

A shape may start and end anywhere, although when shapes are created it is often useful to have them a constant width. For example, plotting upper and lower case letters is best done by starting at the top left hand corner and ending just outside the right hand side of the grid. Note that once a 0 or 1 is depressed then 'plot off' or 'plot on' are in operation until changed by pressing one of the keys again.

Listing 3 shows the interaction with the user after a shape is ended. The hex code for the shape is printed on the VDU and it is usual to save this code in memory to record the shape. If the shape is not saved in the memory then the shape number is unchanged. Not saving a shape provides a let out for bad plotting. The shape table is saved beginning at location $9000 (36864). This can be altered by redefining HIMEM and variable B2 in line 1 of the program in Listing 4. Shapes may be checked using the plot option, but only after they have been saved in memory. The user proceeds to the next shape definition until the designated number of shapes is reached or an earlier exit is made.

LISTING 3



```
SHAPE 1
2D 2D DE 36 36 6E 01 00
PLACE IN MEMORY?Y
PLOT YOUR SHAPES?N
ANOTHER SHAPE?Y
```

Before exiting the program information upon the BSAVE command is given to enable a shape table to be stored on disk. In the example of the listings BSAVE FILENAME, A$9000,L$200E is output (see pp92–93 DOS reference manual).

Once the shapes have been created using the program SHAPES and saved on disk they can be loaded into memory either at the locations where they originated or another designated location with the command BLOAD FILENAME or BLOAD FILENAME,A$8000 where $8000 is a new starting location. It is necessary to protect the shape table from overwriting with a HIMEM command corresponding to the lowest memory location of the table (HIMEM 36864 for $9000 upwards). Also the shape table's reference locations ($00E8 and $00E9) must be set to this lowest location with commands POKE 232,0 and POKE 233,144 for the latter example (see p96 Applesoft Programming reference manual).

Listing 5 gives an example of a program that references the created shape table of this article and plots the Jth shape with the command DRAW J AT 50,50.

Experience with shape plotting suggests that numerous moves (large grid size, small mesh) are needed to give large scale DRAW's and the best shapes are achieved by plotting left to right methodically rather than haphazardly or up and down.

Happy shaping.

LISTING 4

```
1  HIMEM: 36864: HOME :B2 = 36864

2  DIM M(100),A1$(50),A2$(50): VTAB
   21: INPUT "THE NO. OF SHAPES
   ?";NS
3 B1 = B2:Q = B1 + 2 * NS + 2
4 SH = 1
5  INPUT "GRID SIZE(WIDTH,HEIGHT)
   ?";X1,Y1
7  INPUT "FINENESS?";IC: INPUT "S
   TART OF SHAPE?";IX,IY:IX = I
   X - I:IY = IY - I
8  POKE B1,NS: POKE B1 + 1,0:Q3 =
   B1:PL = 4:BA = 16: GOSUB 100
   0:B3 = 232: GOSUB 1140:B1 =
   B1 + 2
10  PRINT "SHAPE ";SH
12  GOSUB 520
20  GOSUB 635
40  GOSUB 50
46  INPUT "A PLOT OF YOUR SHAPES?
   ";V7$: IF V7$ = "Y" THEN  GOSUB
   1500
47  IF SH ) NS THEN  PRINT "END O
   F SHAPES": GOTO 2000
48  INPUT "ANOTHER SHAPE?";V7$: IF
   V7$ = "Y" THEN 10
49  GOTO 2000
50  REM  CONVERT MOVES TO BINARY
   THEN HEX
55 V = 1:V2 = 1
60 C$ = "":K = 1:A$ = ""
70 ID = 0
80 M = M(V):V = V + 1
100  IF M = 8 AND K = 1 THEN 190
110  IF M = 8 AND K = 2 THEN A$ =
   "00000" + A$: GOTO 160
120  IF K = 3 AND (M ) 3 OR M = 0
   ) THEN ID = 1:A$ = "00" + A$
   : GOTO 160
130 BA = 2:PL = 3:Q3 = M: GOSUB 1
   000
140 A$ = BT$ + A$:K = K + 1
150  IF K (  = 3 THEN 80
160 A$ =  RIGHT$ (A$,8)
180  GOSUB 330
190  IF M = 8 THEN A$ = "00000000
   ":K = 4:C$ = "END": GOSUB 33
   0: RETURN
200  IF ID = 1 THEN ID = 0:K = 1:
   A$ = "": GOTO 110
210  GOTO 60
330  REM  PRINT HEX CODE AND TO M
   EMORY IF REQUIRED
335 B$ =  RIGHT$ (A$,4): GOSUB 45
   0:A1$ = S$
340 B$ =  LEFT$ (A$,4): GOSUB 450
   :A2$ = S$
360  PRINT A2$;A1$;" ";
362 A2$(V2) = A2$:A1$(V2) = A1$:V
   2 = V2 + 1
364  IF C$ = "" THEN 440
365  PRINT : INPUT "PLACE IN MEMO
   RY?";V7$: IF V7$ = "Y" THEN
   367
366  GOTO 430
367 Q3 = Q - B2:BA = 16:PL = 4: GOSUB
   1000
368 B3 = B1: GOSUB 1140
369 B1 = B1 + 2:SH = SH + 1
375  FOR L = 1 TO V2 - 1
380 Z(2) =  ASC (A2$(L)):Z(1) =  ASC
   (A1$(L))
390  GOSUB 1200
410  POKE Q,P:Q = Q + 1
420  NEXT L
430 C$ = ""
440  RETURN
450  REM  BINARY TO HEX SINGLE DI
   GIT
455 S = 0
460  FOR I = 0 TO 3
470 B =  VAL ( MID$ (B$,4 - I,1))
   S = S + B * 2 ^ I
490  NEXT I
500  IF S (  = 9 THEN S$ =  STR$
   (S): RETURN
510 S$ =  CHR$ (S + 55): RETURN
520  REM  SET UP SCREEN
540  HGR : HCOLOR= 3:SX = 40:FX =
   SX + X1 * IC
550 SY = 0:FY = SY + Y1 * IC
560  FOR H = SY TO FY STEP IC
570  HPLOT SX,H TO FX,H
580  NEXT H
590  FOR V1 = SX TO FX STEP IC
600  HPLOT V1,SY TO V1,FY
610  NEXT V1
620 X = SX + IC * IX:Y = SY + IC *
   IY: GOSUB 1000
630  RETURN
635  REM  SHOW MOVES ON SCREEN
637 LA = 1
640  GET A4$
645  IF A4$ =  CHR$ (8) AND LA )
   1 THEN LA = LA - 1:M = M(LA)
   : GOSUB 1600:IP = 1: GOTO 74
   0
650  IF A4$ = "0" THEN IV = 0: GOTO
   640
660  IF A4$ = "1" THEN IV = 4: GOTO
   640
670  IF A4$ = "I" THEN M = IV: GOTO
   730
680  IF A4$ = "K" THEN M = IV + 1
   : GOTO 730
690  IF A4$ = "M" THEN M = IV + 2
   : GOTO 730
700  IF A4$ = "J" THEN M = IV + 3
   : GOTO 730
710  IF A4$ = "E" THEN M = 8: GOTO
   730
720  PRINT  CHR$ (7): GOTO 640
730  IF M = 8 AND M(LA - 1) = 8 THEN
   720
735 M(LA) = M:LA = LA + 1: IF M =
   8 THEN 890
740  IF M (  = 3 THEN  HCOLOR= 0
750  IF M )  = 4 THEN  HCOLOR= 3
760  IF IP = 0 THEN  GOSUB 900
765  IF IP = 1 THEN  GOSUB 1000
770 Z = M + 1: ON Z GOTO 780,790,
   800,810,780,790,800,810
780 Y = Y - IC: GOTO 820
790 X = X + IC: GOTO 820
800 Y = Y + IC: GOTO 820
810 X = X - IC
820  IF X ( SX THEN X = SX:IP = 1
   : GOTO 870
830  IF X ) FX THEN X = FX:IP = 1
   : GOTO 870
840  IF Y ( SY THEN Y = SY:IP = 1
   : GOTO 870
850  IF Y ) FY THEN Y = FY:IP = 1
   : GOTO 870
860  GOTO 880
870  PRINT  CHR$ (7):LA = LA - 1
880  IF IP = 1 THEN  HCOLOR= 0: GOSUB
   900
882  HCOLOR= 3: GOSUB 1000
883 IP = 0
885  GOTO 640
890 LA = LA - 1: RETURN
900  REM  CLEARS OR FILLS GRID UN
   IT
901 EN = IC: FOR I = 1 TO EN - 1
910 X3 = X + 1:X4 = X + IC - 1:Y3
   = Y + I
920  HPLOT X3,Y3 TO X4,Y3
930  NEXT I
940  RETURN
1000  REM   DEC TO ANOTHER BASE B
   A WITH PL PLACES
1020  FOR I = 0 TO PL - 1:B(I) =
   0: NEXT I
1030 S = 1: IF Q3 = 0 THEN 1090
1040  FOR I = 0 TO PL
1050  IF S ) Q3 THEN 1080
1060 S = S * BA
1070  NEXT I
1080 B(I - 1) =  INT (Q3 * BA / S
   ):Q3 = Q3 - S * B(I - 1) / B
   A: IF Q3 (  ) 0 THEN 1030
1090 BT$ = "": FOR I = PL - 1 TO
   0 STEP  - 1:AB$ =  STR$ (B(I
   ))
1100  IF B(I) ) 9 THEN AB$ =  CHR$
   (55 + B(I))
1110 BT$ = BT$ + AB$: NEXT I
1120  RETURN
1140  REM  SPLIT HEX TO DEC THEN
   MEMORY
1150  FOR I1 = 0 TO 2 STEP 2:I2 =
   I1 / 2:Z(I) =  ASC ( MID$ (B
   T$,4 - I1,1)):Z(2) =  ASC ( MID$
   (BT$,3 - I1,1)): GOSUB 1200:
   POKE B3 + I2,P
1160  NEXT I1
1170  RETURN
1200  REM  HEX TO DEC
1205 P = 0
1210  FOR I = 1 TO 2
1220  IF Z(I) ( 58 THEN Z(I) = Z(
   I) - 48
1230  IF Z(I) ) 64 THEN Z(I) = Z(
   I) - 55
1240 P = P + Z(I) * 16 ^ (I - 1)
1250  NEXT I: RETURN
1500  REM  PLOT THE J TH SHAPE
1505  INPUT "SHAPE,SCALE?";J,S: SCALE=
   S
1508  IF J = 0 THEN 1540
1510  HGR : HCOLOR= 3
1520  DRAW J AT 50,50
1530  GOTO 1505
1540  RETURN
1600  REM  WRONG MOVE
1610  IF M = 0 OR M = 4 THEN M =
   2: GOTO 1660
1630  IF M = 1 OR M = 5 THEN M =
   3: GOTO 1660
1640  IF M = 2 OR M = 6 THEN M =
   0: GOTO 1660
1650  IF M = 3 OR M = 7 THEN M =
   1
1660  RETURN
1800  REM  PLOT DOT
1810 X3 =  INT (X + IC / 2):Y3 =
   INT (Y + IC / 2): HPLOT X3,
   Y3
1820  RETURN
2000  REM  BSAVE MEMORY DETAILS
2002  HOME
2005  TEXT
2010 PL = 4:BA = 16:Q3 = B2: GOSUB
   1000:A$ = BT$:Q3 = Q - B2: GOSUB
   1000:L$ = BT$
2020  PRINT "TO SAVE YOUR SHAPES
   USE THE COMMAND:-": PRINT "
   BSAVE FILENAME,A";A$;",";"L
   $";L$"
2030  PRINT "AFTER THE PROGRAM EN
   DS WHICH IS NOW!"
2040  END
```

LISTING 5

```
10  HIMEM: 36864: POKE 232,0:
    POKE  233,144
14  HOME
15  VTAB 21
20  INPUT "YOUR SHAPE AND
    SCALE?" ;J,S
22  HGR : HCOLOR= 3
25  IF J = 0 THEN 60
30  SCALE= S: ROT= 0
40  DRAW J AT 50,50
50  GOTO 20
60  TEXT
70  END
```

Using the 16K as a desk calculator

By R.J. SPARKS

Calculator is a program that allows the 16K ZX-81 to be used as a desk calculator. Eleven registers are available whose contents are permanently displayed on the screen. One, the X-register, holds the result of calculations performed in immediate mode, e.g. entering 4*3 places the value 12 in X. In addition there are 10 registers labelled A to J that can be used to store the results of calculations or as variables in expressions to be evaluated e.g. entering A=4*3−1 places the value 11 in A.

To store a value in one of the registers A to J, the register name must appear on the left of an equals sign; on the other hand, X cannot appear on the left of an equals sign, although it can be used as a variable in an expression.

An input string can consist of up to 20 arithmetic or logical expressions separated by colons (:), and these are evaluated sequentially from left to right; e.g. A=3:B=A**2:2*B will place the values 3,9,18 in the A,B and X registers, respectively. Incidentally, the program can be used to solve the central problem of Hamlet: 2*B OR NOT 2*B is 2*B every time; no wonder he went mad.

Calculator recognizes 4 command symbols, permanently displayed on the screen for easy reference. These are: S to store an expression string: R to execute it; P to print it without execution; M to switch between FAST and SLOW modes during calculations. An expression string preceded by the symbol S, e.g. SA**2:A=A+1, results in the string being stored in memory without execution. Entering the command, R, causes the stored expression string to be evaluated.

A stored string can be displayed without being evaluated by entering P. Evaluation of complex expressions can be rather slow, so the option exists for switching to FAST mode during the calculations. This is carried out by the command M, which switches between FAST and SLOW. The current mode is displayed on the screen in inverse characters.

Error traps detect the use of an invalid register name or an attempt to have more than 20 expressions in a single expression string. The latter situation results in a STACK FULL message.

Long, frequently used expression strings can be preserved by saving CALCULATOR on cassette with the required string stored in memory. This can be conveniently done by exiting from the program and executing a GOTO 9900 statement in immediate mode. This will result in Calculator being saved such that when reloaded

Programs available include:
Chess
Galaxians
Pilot
Moon Lander

later it will self-start, preserving the data originally present.

ZX-81 Calculator

```
10 REM DIM R(10)
20 DIM Z(21)
25 LET E$="EXPRESSION"
30 LET S$="16 spaces"
35 LET G$="0"
40 LET X=0
42 FOR Q=1 TO 10
44 GOSUB 1040+10*Q
46 NEXT Q
47 REM **********************
48 REM *SET UP THE SCREEN*
49 REM **********************
50 PRINT AT 0,10;"[CALCULATOR]"; AT
2,20;"S TO STORE"; AT 3,20; "R TO
EXECUTE"; AT 4,20; ": "; E$; AT 5,22;
"SEPARATOR"; AT 6,20; "P PRINT"; AT
7,22; E$; AT 8,20; "M FAST< >[SLOW]
"; AT 3,0; "X"; X
60 FOR Q=1 TO 10
70 PRINT AT Q+4, 0; CHR$ (Q+37); " ";
R(Q)
80 NEXT Q
85 LET GOFAST=0
90 PRINT AT 16,0; E$
96 REM **********************
97 REM * MAIN PROGRAM LOOP *
98 REM **********************
100 LET INSP=0
102 INPUT F$
104 IF F$="P" THEN LET INSP=1
110 IF F$="R" OR INSP THEN LET
F$=G$
120 IF F$="S" THE GOTO 600
125 IF F$="M" THEN GOTO 700
126 REM **********************
127 REM *PRINT THE EXPRESSION*
128 REM **********************
130 FOR L=17 TO 21
140 PRINT AT L,0;S$+S$
150 NEXT L
160 PRINT AT 17,0;F$
170 IF INSP THEN GOTO 100
180 IF GOFAST THEN FAST
195 REM **********************
196 REM *SCAN THE STRING FOR *
197 REM *SEPARATORS: *
198 REM **********************
200 LET L=1
210 LET Z(L)=0
220 FOR K=1 TO LEN F$
230 IF F$(K)< > ":" THEN GOTO 270
240 LET L=L+1
250 IF L  20 THEN GOTO 1000>
260 LET Z(L)=K
270 NEXT K
280 LET L=L+1
290 LET Z(L)=LEN F$
296 REM **********************
297 REM *EVALUATE EXPRESSIONS*
298 REM *BETWEEN SEPARATORS*
299 REM **********************
300 FOR K=2 TO L
310 LET P$=F$(Z(K-1)+1 TO Z(K)
-1+(K+L))
320 IF LEN P$=1 THEN GOTO 340
330 IF P$(2)="=" THEN GOTO 500
340 LET X=VAL P$
350 PRINT AT 3,2;S$;AT 3,2;X
355 SLOW
360 GOTO 570
495 REM **********************
496 REM *EXPRESSION RESULT IS*
497 REM *TO BE STORED IN ONE*
498 REM *OF THE REGISTERS A-J*
499 REM **********************
500 LET Q=CODE P$(1)-37
510 IF Q<1 OR Q >10 THEN GOTO 550
520 LET R(Q)=VAL P$(3 TO LEN P$)
525 GOSUB 1040+10*Q
530 PRINT AT Q+4, 2;S$;AT Q+4,2;
R(Q)
540 GOTO 570
550 PRINT AT 17,0;S$+S$; AT 17,0;
"[INVALID REGISTER NAME]"
570 NEXT K
580 GOTO 100
595 REM **********************
596 REM *STORE THE EXPRESSION*
597 REM **********************
600 LET G$=F$ (2 TO LEN F$)
610 GOTO 100
695 REM **********************
696 REM *CHANGE FAST/SLOW MODE*
697 REM **********************
700 LET GOFAST=1-GOFAST
710 IF GOFAST THEN PRINT AT 8,22;
"[FAST] <> SLOW"
720 IF NOT GOFAST THEN PRINT AT
8,22;"FAST <> [SLOW]"
730 GOTO 100
995 REM **********************
996 REM *MORE THAN 20*
997 REM *SUB-EXPRESSIONS*
998 REM **********************
1000 PRINT AT 17,0;S$+S$; AT 17,0
"[STACK FULL]"
1010 GOTO 100
1045 REM **********************
1046 REM *INSERT VALUE INTO*
1047 REM *APPROPRIATE REGISTER*
1048 REM **********************
1050 LET A=R(1)
1055 RETURN
1060 LET B=R(2)
1065 RETURN
1070 LET C=R(3)
1075 RETURN
1080 LET D=R(4)
1085 RETURN
1090 LET E=R(5)
1095 RETURN
1100 LET F=R(6)
1105 RETURN
1110 LET G=R (7)
1115 RETURN
1120 LET H=R(8)
1125 RETURN
1130 LET I=R(9)
1135 RETURN
1140 LET J=R (10)
1145 RETURN
9900 SAVE "CALCULATOR"
9950 GOTO 50
9999 REM ***END OF PROGRAM***
```

A ROM with a view

By PIP FORER

The idea of reviewing the Beeb's entire software base has got me a little worried: the undertaking is a little too ambitious. Instead, I have decided to go only half way into software this month. We look at what some call firmware: hard software, or in this case the ROM-based software on the Beeb. In particular, this choice has arisen because I have been experimenting with two new Beeb ROMs, the word processors, Wordwise and View, which will soon be available in New Zealand. The first comes from Computer Concepts and the second from Acorn itself. Looking at these may tell us a bit about the idea of paged ROMs and a bit about the quality of this emerging firmware.

First, we had better establish just what the ROM slots on the Beeb are, and how they work. If you have ever peeped under the lid of the BBC computer you will have noticed that in the right-hand corner nearest to you, close to being underneath the 'break' key, are a series of either empty slots or large ROM chips. These are the so-called sideways ROMs. In total there are five slots there, and these contain at least two ROMs in most machines. These two represent the machine operating system (MOS) and the BASIC language ROM. Each is 16K and between them these two ROMs account for 32K addressing space, leaving the remaining 32K as free RAM. If you have a disk operating system (DOS) in your machine, then not only are you fortunate, but you will have a third ROM in your slots. The remaining empty slots can be used for a variety of purposes by plugging in extra ROMs. Econet takes one slot, alternative languages such as BCPL take another each. Graphics systems are being designed for these slots. However, the first marketed products to use them have been word processors.

Addressing ROMs

All of these extra ROMs can be accessed immediately from the keyboard by issuing the relevant commands. Thus a Beeb can have several languages or applications on ROMs and switch between them instantly in so far as they do not conflict in their memory usage. Furthermore, there is an automatic precedence over which ROMs are brought into play at any time. Apart from system functions such as MOS, the right-most language or application ROM is accessed first. When turned on the machine starts up in the application or language there. This may be BASIC as you are accustomed to. It may just as well be another language or a word processor.

I ought to add that the five initial slots can be extended internally and externally to expand your number of slots. In terms of having facilities up and ready to go instantly the installed (but removable) ROM offers benefits over disk or tape-based software. It also saves memory space. The disadvantage, say for a network system, is that you cannot down-load a ROM to a set of machines: each must have one.

Some readers may be asking, "What is a word processor?" Essentially, it is a program that allows the user to type in documents and modify them on the screen before sending out a printed copy. On the way it does all sorts of tedious chores for the author, such as centring titles.

Indicative software?

The two ROMs discussed here (Wordwise and View) are of interest in that they may be an indicator of the quality of further products. How can we gauge them against other word processors that are around? Of course there is no simple answer to such a question but we can make a few comments. First, both systems, Wordwise and View, are friendly.

If you have any word processing experience you will find them easy to use and adapt to. If you are fresh to the field the documentation is sufficient and accurate on both. Apart from a technical manual both systems give introductory help: View through an outstanding tutorial booklet "Into View" and Wordwise through a cassette tape with a sample document. Both systems offer either disk or tape based storage and access to system commands from within the word processor.

In terms of word-processing power these systems would be in the middle range and they do most of the standard chores quite effectively. Both support search and replace, where the user can check throughout an entire document for a particular word and change it (remembering this was for a non-American audience I had to do that with "program" in this document). View has a more flexible and acceptable approach here.

Both allow you to count the number of words at any time (799 up to here). So far both represent similar products, although View offers more commands and better use of the special function keys (29 functions as opposed to 10). View also provides some unusual

capabilities for a package of this sort. Among them is a "two-sided page" facility for use with page headers and footers. You know, for instance, how a magazine has its page numbers to left or right of the page depending on whether it is an odd or even page number? View handles that positioning automatically.

The real test of the ROMs is perhaps the degree to which the systems use the BBC's special features. The world is full of word processors running on equipment and not using its capabilities to the full. Wordwise scores quite well here. It uses colour to show where a control character has been imbedded. Normally working in 40 column mode 7, it also has a facility to see your document in 80 column splendour as it will appear on the page when printed.

View, however, has the edge. It allows you to choose the BBC mode you work in and make your own trade-offs between visible text and high memory usage.

More to the point it allows you to continuously edit a large document continuously using disks. Loading the document with this simply puts a first section into memory for working on. The command, "More", stores that part and loads a new section. This way you get to keep your document whole and get around the memory limitations of an 80 column screen. This is a well-thought-out design tailored to the Beeb's needs and strengths. The View ROM also gets away from the annoying BASIC demand that all commands be in upper case. View is generally the more powerful editor of the two.

What are the shortcomings of the ROMs? One would find it hard to fault them on crashability. The error catching is of a high standard. For instance neither will allow you to choose a mode that destroys your current writing through the mode's memory needs. I have two complaints to date. One is that deletion is not reversible. If you remove a line by accident with View (and with triple use of the special function keys that is very easy to do) you have lost it. That is extremely unfriendly. The other is that View fails to make it plain how to transfer a control code to a printer to change text size or some other function (although the British magazine, "Beebug," reports this use with Wordwise). Experimenting to date suggests that this is not easily achieved. With View, it is necessary to buy a separate printer drive program (the cover documentation says this is just for daisy-wheel printers but then cites the popular Epson MX-80 as one). This separate driver is a surprising glitch on the program and its capabilities and implications are poorly documented in the View manual. Since efficient printer driving is essential to using a word processor well, this aspect leaves a question mark over View. Since neither ROM supports subscripts and superscripts normally (so a user might want to use printer control characters to allow this to happen) this question of printer driving could be very important to some users.

For programmers

The band of hobbyist programmers is by now asking what all this has for them. For authors maybe, but is there any other use of the word processor? The answer in short is yes. The word processors mentioned here potentially allow you to load a BASIC program or any text file for editing, as long as the file has been placed into text mode using SPOOL (i.e. *SPOOL name, LIST, *SPOOL). That puts a whole new range of editing facilities available to you, for instance the immediate changing of a variable name throughout a program or enhanced features for copying sections of programs about.

That is worth a lot of time if you are a keen programmer involved in long programs. Again there are questions as to how this works in practice but certainly some things can be done in this area. Wordwise is very well set up for this job but View is much less clearly suited because of the way it inputs and outputs its stored text. In fact I found its use hazardous.

Over all, these ROMs set a good standard. Although they support tape commands it would be dishonest to pretend (as is sometimes implied) that they are much use without the speed and reliability of disks. In Britain, Wordwise was released earlier and at lower cost then View. The final products in fact differ in their capabilities and strengths: the specialism and power of View against the easier interface to the outside world of Wordwise.

Both products have clear evidence of quality that bodes well for their success, but both have minor blemishes. Look around though. At least one disk-based word processor is for sale and a new ROM aimed at the educational market is under way in Britain. In the meantime we will try to report back on the question of control character using the View printer driver and its use for program editing.

Acorn Rivals

Following the View/Wordwise rivalry and the Torchpack alternative second processor and disks comes a new disk-operating system ROM from an independent supplier. The Disk Management Filing System (DFMS) claims it can be co-resident with the normal DOS ROM but offers enhanced features such as more and longer file names, a more efficient use of disk space, more flexible file control and the ability to read CP/M disks. Not only that, but its makers claim it is available now and free of chip supply shortages.

New Sharp model

Beechey & Underwood have released a new model of Sharp business computer, the MZ 3540, which runs both the Sharp FDOS and the standard CP/M based operating systems.

The basic unit is released with 128K RAM expandable to a maximum of 256K RAM.

This machine features futuristic styling, a separate super-thin keyboard with shift lock lamp, twin Z80A processors, running at 4mHz and has dual 320K 5¼" disk drives built in to the main processor unit which use double sided double density diskettes.

The 12" monochromatic green

Turn to page 58

Some useful BASIC subroutines

By Shayne Doyle

Here is a list of the most useful BASIC subroutines accessible for the Microbee by the user.

Subroutines Jump Table set:

Name: MCHINW Address: 8006H

This subroutine waits for a keypress and returns the ASCII value in A. The input device system is not used, the scanned keyboard is directly accessed. Destroys AF.

MCHINL — 8009H

Scans the keyboard, returning NZ and the ASCII key value in A if a key was pressed, otherwise returns Z. Destroys AF.

DGOS-VDR — 800CH

Takes the ASCII representation of the character in the B register, and treats this as a code to be sent to the VDU, i.e. control codes such as CR and LF will cause these functions, but normal characters will be printed in the next location on the screen. Requires ASCII character code in B, destroys nothing.

RDBYTE — 8012H

Reads the next byte off tape in Kansas City Standard and returns its 8-bit value in A. This subroutine must be used in a continuous fashion for reliable data transfer; intervening routines must not take longer than about 2 bit times. The tape speed must be previously set up in "lo-cycles=00E9H", 4 for 300 baud and 1 for 1200 baud input. Returns character off tape in A. Destroys AF.

WRBYTE — 8018H

Writes the 8-bit value in A to tape. Extreme care must be taken when using this routine to ensure that the delay between calls is preferably less than 1/1200 second or the tones generated will not be continuous, and garbage will be read back later on. Speed should have been set up as for RDBYTE. Requires byte to write in A, destroys nothing.

RDBLOK — 8015H

This routine reads a block of B characters from the tape at (hl) and decrements DE for each byte read. A check sum is expected at the end of the block and this routine will crash if this is wrong. Requires block destination in HL, number of bytes to read in B, total byte count in DE (not actually used by this routine). Destroys B and C. Returns block of checksummed data at (HL), end of block+1 in HL, total bytes left in DE.

WRTBLK — 801BH

This routine writes out the block at (HL) for length B with a check sum at the end. Requires address

Turn to page 57

BOOKS

Books for the beginner

"Beginning BASIC" (Second Edition) By P.E. Gosling. MacMillan, U.K., 1982. Paperback, 15.5 x 23.5 cm, 106 pages, $11.95.

"Program Your Microcomputer in BASIC." By P.E. Gosling. MacMillan, U.K., 1981. Paperback, 15.5 x 23.5 cm, 91 pages, $13.95.

"Instant BASIC." (Second Edition). By Jerald R. Brown. diLithium Press (U.S.A.), 1982. Paperback, 21.2 x 27.8cm, 196 pages, $25.95.

Reviewer: Gordon Findlay

"Of making many books there is no end." And nowhere is this truer than in the computer field. It seems as though every man and his dog is writing a book on BASIC for beginners. These three are just that – books on programming in BASIC, for beginners, with the stated intention of being machine independent. All have their good points, and all have their bad. There are many others I could have included in this review, but there are obvious limitations of time and space, not to mention endurance.

I have listed the books in approximate order of size, and in order of increasing content. All purport to start at the same place – absolute zero.

"Beginning BASIC" moves slowly into BASIC, first investigating "what is a computer?" and "Talking to a Computer." This second chapter gives step-by-step instructions for using a typical teletype-based interactive system (the actual examples are in Data General Eclipse's dialect). It moves through the standard arithmetical, input and output statements, giving a fair number of examples. The book moves on to loops and print statements, spends a good deal of space on lists and arrays, briefly mentions function statements, remarks, and finishes with further details on saving and loading programs, with instructions about operating a paper-tape reader/punch.

The tone of the book is very didactic, and almost all the examples are algebraic or scientific in nature – calculating various function values, finding averages, solving equations. The book concludes with 16 "specimen" programs, all mathematical, and frankly, boring.

The full title of the third book is "Instant Freeze-Dried Computer Programming in BASIC, 2nd Astounding! Edition," and this will give you some ideal of the style. It is a very informal book, with lots of pictures, cartoons, little notes in the margins, a bookworm which lives in the spine of the book, and absolutely no modesty whatsoever! The book also contains a substantial amount of information on BASIC.

"Instant BASIC" is the easiest to read, and gives a good coverage. The two books by Gosling are designed for different environments, and may suit those who only want an introduction – "Beginning BASIC" for scientific types, "Program your micro-computer in BASIC" for general use.

I fear that the book, although a "second edition", is fairly dated. It gives a very restricted coverage of BASIC (no mention of strings), subroutines, etc., and has a narrow range of examples. Presentation is workmanlike, although unexciting; but a few listings are reproduced badly. No attempt is made to teach how to design a program in the first place, before coding. This is chiefly because the author never gets involved in an example of more than a few lines.

The second book by Gosling is quite unlike the first. Again it begins with a survey of the hardware, concentrating this time on microcomputers. This would be a very useful survey for the beginner. The second chapter covers the use of BASIC to make calculations, using arithmetic operations, input and print statements. Thereafter the book is divided into 19 "activities", each dealing with a group of instructions by way of example, and intended to be worked through at a machine. The examples were obviously run on a

PET, but are pretty much machine-independent. As well as the material covered in the first book, the author included strings, subroutines, the ON-GOTO statement, more output formatting, and a wider range of examples. The programs listed all produce text, and some are not very user-friendly, but on the whole a good collection. The book finishes with a very good chapter on "Bug-hunting". Presentation is again tidy, with many illustrations in the first two chapters, and virtually none is the rest of the book.

Getting started in BASIC

"Professional Programming Techniques Starting with the BASICs", by Richard Galbraith.
Published by TAB Books Inc., 1982.
Paperback, 301 pages. $21.95. Reviewed by Warren Marett.

Despite the tacky title, and the fact that the title is not indicative of the contents of the book, this book is not without merit.

Essentially it is a book that tries to teach programming in BASIC, starting with simple commands and ending with handling large files and fancy print formats. It covers most programming situations in a straightforward narrative style.

The book should not suggest, as it does on the cover, that it shows the reader "how to start off with good habits".

For example, the REM statement (for remarks) is not described until over a third of the way through the book. The author concludes his section on the REM statement with the words:

> "The use of remarks along with spacing within your statements will go a long way towards making your programs understandable. The remarks and any extra spaces do take up space in the computer's memory, so don't go overboard explaining each line. No amount of explaining will make up for a poor design, and a good design does not need too many remarks to make it understandable."

Chapters 1 and 2 give background information on computers, including explanations of commonly used technical terms. Perhaps these chapters do go too deep in parts, with the danger that they might put the beginner off before he gets into the practical work — particularly since the book is packed full of words with few diagrams or other mechanisms.

Starting with chapter 3 the book goes through most of the concepts that will be needed by the BASIC programmer. It finishes with four useful appendices: Ideas for Programming Practice, Stages of Program Development, BASIC Grammar, and BASIC Dictionary. The index is sufficient but not generous.

For all his hard work, the author may have attempted too much with this work. The beginner needs a book even more patient (and certainly more interestingly presented) and the more advanced reader might not get past the introductory chapters — even though it would be worth his while.

Many people will disagree with that last phrase, particularly for non-trivial programs. And comments about REM statements taking up space should be qualified with the observation that this is

To page 57

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Some timely help

By GORDON FINDLAY

Time for some thoughts on time (sorry). Time and date calculations are often difficult and time consuming to code (he's done it again!). I have collected some tricks, and invented some more, to provide some help. I will write them for disk BASIC, but the conversions to level II are straight forward; sing out if you get stuck.

First, in all these routines use a string variable, TM$. This string contains the time, in the form hh:mm:ss. For example, this line is being typed at 07:48:16. Your program will need to set this string as required. In disk systems. TM$ is always available as RIGHT$ (TIME$,8), and is kept up to the second automatically. However, TM$ will not contain the actual clock time, unless you set the time from DOS READY. Otherwise, the value is the elapsed time since DOS was last booted. For most purposes, the elapsed time does as well as the clock time.

Remember that the DOS time-update is done from software, and might be turned off by some programs. That's what CMD "T" does – turns off the DOS interrupts which do the timing to avoid upsetting the delicate timing (of a different sort) required for tape I/O.

The time may be set from a program, by loading the appropriate locations with the values you want. The locations are as follows, for the Model I (including System-80) and the Model III separately:

	Model I	Model III
Seconds:	16449	16919
Minutes:	16450	16920
Hours:	16451	16921

Of course, computations cannot be done with the time in this form. First we must convert to "seconds". This is to convert TM$ to 'seconds after 12:00:00':

```
SE = (VAL (LEFT$(TM$,2)) * 60 + VAL (MID$(TM$,4,2)) ) * 60 +
VAL (RIGHT$(TM$,2))
```

Conversion the other way is equally easy:

```
HR = INT(SE/3600): MN = INT((SE-3600*HR)/60): SC = SE - 60 * (MN + 60 * HR)
TM$=RIGHT$("O"+ MID$(STR$(HR), 2,2),2) + ":" + RIGHT$ ("O"+ MID$(STR$(MN),2,2)2) + ":" +RIGHT$ ("O"+MID$(STR$(SC),2,2),2)
```

```
2 REM "BYTES"
6 IF PEEK 16576 = 10 THEN GOTO 100
8 GOTO 210
100 LET B = 0
110 FOR I = 0 TO 200
120 IF B <> 0 THEN GOTO 150
130 IF PEEK (16577+I) = 118 THEN LET B = PEEK (16580+I)
140 IF B <> 0 AND PEEK (16579+I) <> 20 THEN GOTO 210
150 NEXT I
160 PRINT "LINE 10 USES ";PEEK16577+4;" BYTES,"
170 PRINT
180 PRINT "LINE 20 USES ";B+4;" BYTES."
190 PRINT
200 LIST 10
210 PRINT "ENTER LINES 10 AND 20, THEN RUN."
```

The "MID$" functions are involved here because the STR$ function allows for a sign by appending a space at the beginning of each "STR$". The ' "O"+RIGHT$(' manipulations ensure that the hours, minutes and seconds each have two digits.

To find the time between two events, find the TM$ for the first, convert to seconds, and repeat for the second. The difference gives the time between them. This may be used to time parts of a program.

This TM$ may also be used to 'time out' a program; in other words to allow a fixed time, and if no input is received within this time, to move on. Here is an example:

```
10 PRINT "YOU HAVE JUST TWO SECONDS TO PRESS A KEY!"
15 TM$=RIGHT$(TIME$,8)
20 'CONVERT TO SECONDS:
25 SE = (VAL(LEFT$(TM$,2)) * 60 + VAL(MID$ (TM$,4,2)) 60 +VAL(RIGHT$ (TM$,2))
30 SE = SE + 2:REM TIME ALLOWED TO REACH - NOW CONVERT THIS TO STRING FORM
35 HR = INT(SE/3600): MN = INT((SE-3600*HR)/60)
40 SC = SE - 60 * (MN +60 * HR)
45 TM$=RIGHT$("O"+MID$(STR$ (HR),2,2),2) + ":" + RIGHT$("O"+ MID$(STR$(MN),2,2),2)+ ":" +RIGHT$ ("O" + MID$(STR$(SC),2,2),2)
50 X$= INKEY$:IF X$<>"" THEN GOTO 60
55 IF RIGHT$(TIME$,8) > TM$ THEN GOTO 70 ELSE GOTO 50
60 PRINT "WELL DONE - YOU GOT IT!":END
70 PRINT "TIME'S UP.":END
```

The processing in the keyboard reading loop does mean that the key pressed may be missed if pressed only briefly.

Another useful trick with time is to date each run of a program. This means automatically including the date that a program was used in the text. Here is one way to do so. It involves adding the following lines to the beginning of any program which is to be dated in this way:

```
1 REM******** the asterisks will be replaced with the date
2 ST =PEEK(16548) + 256 * PEEK(16549)
3 PRINT "TYPE DATE - IN FORM DD/MM/YY"
4 INPUT DT$
5 IF LEN(DT$)<>8 THEN PRINT "WRONG FORMAT" : GOTO 3
6 X =ST +4:FOR I = 1 TO 8:POKE X+I, ASC(MID$(DT$,I,1)):NEXT
7 SAVE "program name"
10 REM PROGRAM PROPER STARTS HERE.
```

An explanation of the above. Line 2 locates the start of the program text. Once the date is given, it is POKED into the places originally occupied by the asterisks in the REMark of line 1.X is advanced by 4 from the start of the BASIC text to allow for a line number, a link to the next line, and one byte for the REM token. WARNING - don't store the program on disk with the "A" option! Replace "program name" in line 7 by the actual file name. This works for tape as well - use CSAVE of course. The dating can be avoided by using RUN 10 rather than RUN if you wish.

Disk users can set the date from LEFT*(TIME$,8) rather than an INPUT if the date was entered when DOS was booted.

That's all for now. Remember, write with your problems, and your clever ideas to share.

MICROBEE

From page 51

of block to write in HL, number of bytes in block in B, total number of bytes left in (DE) (not used by this sub). Destroys B and C. Returns end of block+1 in HL, number of bytes left in DE.

RUNO — 801EH

Causes immediate execution of the current BASIC program in memory as if the RUN command had been given. The address of this jump can be put into the auto execute jump word at 00A2H, and then the program will automatically run after RESET or at switch-on.

WARM — 8021H

This jump vector reverses the effects of an auto-run situation. If this routine's address is loaded into the reset jump word at 00A2H then normal resetting will occur.

Initialises the PCG graphics scratchpads and clears the screen as if a BASIC HIRES command had been issued, allowing use of the SET, RESET etc routines in HIRES mode. The "vdmode" byte at 00E5H is set to indicate this mode.

LRS-INIT — 8027H

Sets up the PCG with LORES chunky graphics and sets the "vdmode" byte to reflect this, allowing use of SET, RESET etc in LORES mode.

INV-INIT — 802AH

Fills the PCG with Inverse (black on white) characters and sets the "vdmode" byte accordingly.

UND-INIT — 802DH

Generates underlined characters to be put into the PCG and sets the "vdmode" byte accordingly.

SET-SUB — 8030H

Attempts to set a dot in the current graphics mode. Requires X co-ord in HL, Y co-ord in DE. Returns Z if successful, NZ if co-ords out of range or the PCG is full.

RESET-SUB — 8033H

Attempts to reset a dot, otherwise identical to SET-SUB (above).

INVERT-SUB — 8036H

As for SET-SUB except it attempts to invert the dot.

TEST-SUB — 8039H

Returns the status of any graphics dot in the current graphics mode. Note that no distinction is made between co-ords out of range and dot set conditions. Requires X co-ord in HL, Y co-ord in DE. Returns Z if dot not set, NZ if co-ords out of range or dot set.

PLOT-MEM — 803CH

Performs the appropriate graphics operation (Set, Invert, Reset) in the current graphics mode at each of the best approximation points to the line specified by the X and Y start and end co-ordinates. Requires X start co-ord at (gr-Pseudo+18), X end co-ord at (gr-pseudo+14), Y start at (gr-pseudo+20), Y end at (gr-pseudo+16), plot mode character (S=set, R=Reset, I=Invert) at (plot-type=00E8H). Note that gr-pseudo = 00EBH

STREAM-IN — 803FH

This routine allows access to all BASIC input devices normally available through the IN# command. The devices from which input is desired (only simultaneous input is possible for devices 0 and 1) should have binary ones placed in the bit numbers of the required devices in the "in-dev=00E4" byte. e.g. for input from device 4, load '0010000' binary (20 hex) into 00E4H. Requires input device bits set in "in-dev". Returns NZ if no characters available, else Z and character from selected device in A.

STREAM-OUT — 8042H

Allows access to the output devices normally accessed by the OUT# command. Requires output devices bits set in (out-dev=00E2H), character to send to all selected devices in A.

I trust these calls will be of use to those of you dabbling in machine code. There are more, but I have only summarised the most likely to be used ones here, anyone wishing to obtain a full copy of this list can write to me at 18 Holdsworth Avenue, Upper Hutt.

Please also write if you have anything of interest to other MicroBee users.

BOOKS

From page 53

not true with programs compiled using a BASIC compiler or can be disregarded given sufficient memory, as is often the case now with modern microcomputers.

More time could have been spent on describing good programming practice. An attempt is made to introduce the concepts of structured programming, but it fails dismally.

However, the author, who is a systems and programming supervisor with the Arizona Department of Education, has tried hard to be patient with the reader and has covered many of the points that need to be raised in teaching the novice programmer.

CP/M

From page 33

because a file control block (FCB) keeps track of this. A file may have 16 units, each unit up to 128 records, i.e. up to 16K bytes, so this means 16x16K= 256K bytes.

That very briefly is CP/M version 1.4 or so. Obviously a lot has been left out and glossed over, but the basic is here. The system was improved as time passed, and version 2 came out. This can handle files of 8 Megabytes

Version 1.4 had no way of locking files, but version 2 does so that they can be read only, write only, or accessed only by a user number.

A system has now been announced that is a further progression not version 3, but CP/M 80 Plus. This is a great improvement and now has a HELP feature. When all else fails, you type HELP. Until now, CP/M has been notorious for its compact error messages.

CP/M also has disk buffering, file passwords, a hashed direct access, date/time stamp, and paging, and last, but not least, a kernel BIOS.

The new facilities provide a lot less disk-drive access. By paging, more can be stored in memory and recalled as needed.

CLUB CONTACTS

BBC MICROCOMPUTER USERS GROUP OF NZ, P.O. Box 9592, Wellington. Local meetings:- Auckland: 2nd Wednesday of the month at VHF Clubrooms, Hazel Ave, Mt Roskill. Ph: Dave Fielder 770-630 ext 518 (b). Wellington: 4th Thursday of the month at the Correspondence School staffroom, 1st floor, Portland Cres, Thorndon, 7.30pm. Ph: Anton, 286-289.

SERADO & HART APPLE COMPUTER CLUB, Kerikeri High School, Kerikeri. Lessons, 12:15 to 1:15 weekly. Contact: S. Shearman 79-882 (Kerikeri) or Fairway Drive, Kerikeri.

WHANGAREI COMPUTER GROUP: Tom Allan, 3 Maunu Rd, Whangarei. Phone 83-063 (w). Meets every second Wednesday of the month at Northland Community College.

NZ MICROCOMPUTER CLUB INC. P.O. Box 6210, Auckland. The monthly Meeting is held on the first Wednesday of each month at the VHF Clubrooms, Hazel Ave., Mt Roskill, from 7.30pm. Visitors are also welcome to the computer workshop in the clubrooms, 10am-5pm, on the Saturday following the above meeting.

The following user groups are part of the club. All meetings shown start 7.30pm at the VHF Clubroom.

Other active user groups within the club are:

APPLE, CP/M, DREAM 6800, SMALL BUSINESS, KIM. LNW. SORCERER. 1802 and 2650. They can all be contacted at club meetings or via NZ microcomputer Club, P.O. Box 6210, Auckland.

APPLE USERS' GROUP: Bruce Given, 12 Irirangi Rd., One Tree Hill. Phone 667-720 (h).

ATARI MICROCOMPUTER USERS GROUP: Brian or Dean Yakas. Phone 8363 060 (h). Meetings: Second Tuesday.

BBC USERS' GROUP: Dave Fielder. Phone 770-630 ext 518 (w).

BIG BOARD USER GROUP: Steve Van Veen, Flat 5, 111 Melrose Rd, Mt Roskill, Auckland 4. Phone (09) 659-991 (h).

BUSINESS USERS' GROUP: John Hawthorn, 11 Seaview Rd, Remuera. Phone 542-714 (h), 876-189 (w). Meetings monthly.

COMMODORE USERS' GROUP: Doug Miller, 18 Weldene Ave., Glenfield. Phone 444-9617 (h), 497-081 (w). Meetings: Third Wednesday.

CP/M USERS' GROUP: Kerry Koppert, 2/870 Dominion Rd., Balmoral. Phone 69-5355 (h). Meetings: Micro workshop.

DREAM 6800 USERS: Peter Whelan, 22 Kelston St, New Lynn, Auckland. Phone (09) 875110 (h).

KIM USERS: John Hirst, 1A Northboro Rd, Takapuna. Phone (09) 497-852 (h).

LNW USERS: Ray James. Phone (09) 30-839 (w), 585-587 (h).

SINCLAIR USERS' GROUP: Doug Farmer. Phone 567-589 (h). Meetings: Fourth Wednesday.

SORCERER USERS' GROUP (NZ): Selwyn Arrow. Phone 491-012 (h). Meetings: Micro workshop.

SORD USERS' GROUP: Graeme Hall, 5 Brouder Place, Manurewa (266-8133) (h).

1802 USERS' GROUP: Brian Conquer. Phone 655-984 (h).

The above contacts can usually be found at NZ Microcomputer Club Meetings, or via P.O. Box 6210, Auckland.

Other Auckland-based groups:

ACES (Auckland Computer Education Society): Ray Clarke, 1 Dundas Pl., Henderson. Phone 836-9737 (h).

BBC Club: See entry at head of this list.

CMUG (Combined Microcomputer Users' Group): This is an association of Microcomputer Clubs, Groups, etc, formed to co-ordinate activities and to give a combined voice on topics concerning all micro users. Representation from all Clubs and Groups is welcomed to: CMUG C/- P.O. Box 6210, Auckland.

EPSON HX20 USERS' GROUP. Contact: C.W. Nighy, 14 Domett Avenue, Epsom, Auckland. (Ansaphone, 774-268).

HP41C USERS' GROUP (Auckland): C/- Calculator Centre, P.O. Box 6044, Auckland: Grant Buchanan, 790-328 (w). Meets third Wednesday, 7pm, at Centre Computers, Great South Rd., Epsom.

NZ TRS-80 MICROCOMPUTER CLUB: Olaf Skarsholt, 203A Godley Rd., Titirangi. Phone 817-8698 (h). Meets first Tuesday, VHF Clubrooms, Hazel Ave., Mt Roskill, Auckland.

OSI/BBC USERS' GROUP (Ak): Secretary: Ken Harley, 77 Boundary Road, Auckland. Meets third Tuesday, VHF Clubrooms, Hazel Ave., Mt Roskill.

SYMPOOL (NZ SYM USER GROUP): J. Robertson, P.O. Box 580, Manurewa. Phone 266-2188 (h).

A.Z.T.E.C.: Brian Mayo, Church Street, Katikati. Phone 490-326. Members use all micros.

TAURANGA MICROCOMPUTER CLUB: C. Ward, Secretary, P.O. Box 6037, Brookfield, Tauranga. Phone: 89-234.

BAY OF PLENTY COMMODORE COMPUTER CLUB: D.J. McVay, of 40 Esk Street, Tauranga.

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HAWKE'S BAY MICROCOMPUTER USERS' GROUP: Bob Brady, Pirimai Pharmacy, Pirimai Plaza, Napier. Phone 439-016.

NOTE: If your club or group is not listed, drop a line with the details to: Club Contacts, BITS & BYTES, Box 827, Christchurch. The deadline for additions and alterations is the second weekend of the month before the next issue.

MOTOROLA USER GROUP: Harry Wiggins, (ZL2BFR), P.O. Box 1718, Palmerston North. Phone (063) 82-527 (h).

MICRO AND PEOPLE IN SOCIETY (MAPS): Levin. meets on second and fourth Thursday of each month. D. Cole, 28 Edinburgh Street, Levin. Phone 83-904, or W. Withell, P.O. Box 405, Levin.

WAIRARAPA MICROCOMPUTER USERS' GROUP: David Carmine. 64 Herbert St., Masterton. Phone 86-175.

CENTRAL DISTRICTS COMPUTERS IN EDUCATION SOCIETY: Rory Butler, 4 John Street, Levin. (069) 84-466 or Margaret Morgan, 18 Standen Street, Karori, Wellington. (04) 767-167.

UPPER HUTT COMPUTER CLUB: Shane Doyle, 18 Holdworth Avenue, Upper Hutt. Phone 278-545. An all-machine club.

BBC USER GROUP: Users of other machines welcome too. Write P.O. Box 1581, Wellington, or Phone 861-213, Wellington.

BBC Club: See entry at head of this list.

MICROBEE USERS' CLUB: P.O. Box 871, Wellington, 2nd Sunday of month.

NEC COMPUTER USERS' GROUP: C/- P.O. Box 3820, Wellington.

OSBORNE USER GROUP: Dr Jim Baltaxe, C/- 75 Ghuznee Street, Wellington 1. Phone (04) 728-658.

N.Z. SINCLAIR USERS' GROUP: P.E. McCarroll, 11 Miro Street, Lower Hutt.

NZ SUPER 80 USERS' GROUP: C/- Peanut Computers, 5 Dundee Pl., Chartwell, Wellington 4. Phone 791-172.

OHIO USERS' GROUP, Wellington. Secretary/Treasurer: R.N. Hislop, 658 Awatea Street, Porirua.

ATARI USERS' GROUP, Wellington: Eddie Nickless. Phone 731-024 (w). P.O. Box 16011. Meetings: first Wednesday of month.

WELLINGTON MICROCOMPUTING SOCIETY INC.: P.O. Box 1581, Wellington, or Bill Parkin (h) 725-086. Meetings are held in Wang's Building, 203-209 Willis Street, on the 2nd Tuesday each month at 7.30pm.

WELLINGTON SYSTEM 80 USERS' GROUP: Contact: M. Trickett, Phone: 724-351 (w), 662-747 (h).

NELSON MICROCOMPUTER CLUB: Dr Chris Feltham, Marsden Valley Rd, Nelson. Phone (054) 73-300 (h).

NELSON VIC USERS' GROUP: Peter Archer, P.O. Box 860, Nelson. Phone (054) 79-362 (h).

BLENHEIM COMPUTER CLUB: Club night second Wednesday of month. Ivan Meynell, Secretary, P.O. Box 668. Phone (h) 85-207 or (w) 87-834.

CHRISTCHURCH ATARI USERS GROUP: Contact Edwin Brandt. Phone 228-222 (h), 793-428 (w).

CHRISTCHURCH '80 USERS' GROUP: David Smith, P.O. Box 4118, Christchurch. Phone 63-111 (h).

CHRISTCHURCH PEGASUS USERS' GROUP: Don Smith, 53 Farquhars Rd, Redwood, Christchurch. Phone (03) 526-994 (h), 64-544 (w), ZL3AFP.

CHRISTCHURCH APPLE USERS' GROUP: Paul Neiderer, C/- P.O. Box 1472, Christchurch, Phone 796-100 (w).

OSI USERS' GROUP (CH): Barry Long, 377 Barrington St., Spreydon, Christchurch. Phone 384-560 (h).

CHRISTCHURCH ATARI USERS' GROUP: Edwin Brandt, 61 Ensign Street, Christchurch 3. Phone 228-222.

CHRISTCHURCH SINCLAIR USERS' GROUP: Mr J. Mitchell, Phone 385-141, P.O. Box 33-098.

CHRISTCHURCH COMMODORE USERS' GROUP: John Kramer, 885-533 and John Sparrow. Phone 896-099.

ASHBURTON COMPUTER SOCIETY: Mr J. Clark, 52 Brucefield Avenue.

SOUTH CANTERBURY COMPUTERS' GROUP: Caters for all machines for ZX81 to IBM34. Geoff McCaughan. Phone Timaru 84-200 or P.O. Box 73.

NORTH OTAGO COMPUTER CLUB: Contact: Peter George, P.O. Box 281, Oamaru. Phone 29-106 (b) 70-646 (h).

LEADING EDGE HOME COMPUTER CLUB: Elaine Orr, Leading Edge Computers, P.O. Box 2260, Dunedin. Phone 55-268 (w).

DUNEDIN SORD USERS' GROUP: Terry Shand. Phone (024) 771-295 (w), 881-432 (h).

CENTRAL CITY COMPUTER INTEREST GROUP: Robert Edgeler, Eclipse Radio and Computers, Box 5270, Dunedin. Phone 778-102. Meetings every second Tuesday

SOUTHLAND COMMODORE USER GROUP: (VIC 20 and 64s). Address: C/- Office Equipment Southland, Box 1079, Invercargill.

NOTE: Clubs would appreciate a stamped, self-addressed envelope with any written inquiry to them.

From page 50

high resolution CRT has a non glare screen.

The MZ3540 interfaces a variety of peripherals.

1. Additional mini floppy disk interface.

2. Centonics parallel interface which is compatible with a wide range of printers and X-Y plotters.

3. RS232C interface to add off main unit interfaces to the system when another printer or RS232C device is necessary.

The MZ3540 retails at $7,490.00 through a nationwide network of independent agents and Armstrong and Springhall branches.

GLOSSARY

Algorithm: A list of instructions for carrying out some process step by step.

Applications program: A program written to carry out a specific job, for example an accounting or word processing program.

Array: A data type found in high level languages, which is stored in a contiguous block of memory. Accessed by the array name and an index making it easier to process groups of data in many situations.

BASIC: Beginners' All-purpose Symbolic Instruction Code. The most widely used, and easiest to learn, high level programming language for microcomputers.

Baud: Speed of transferring data, measured in bits per second.

Binary: The system of counting in 1's and 0's used by all digital computers. The 1's and 0's are represented in the computer by electrical pulses, either on or off.

Bit: Binary digit. Each bit represents a character in a binary number, that is either a 1 or 0. The number 2 equals 10 in binary and is two bits.

Boot: To load the operating system into the computer from a disk or tape. Usually one of the first steps in preparing the computer for use.

Buffer: An area of memory used for temporary storage while transferring data to or from a peripheral such as a printer or a disk drive.

Bug: An error in a program.

Byte: Eight bits. A letter or number is usually represented in a computer by a series of eight bits called a byte and the computer handles these as one unit or "word".

CAL: Computer Aided Learning CAL programs are written to take different actions on different student answers.

Computer language: Any group of letters, numbers, symbols and punctuation marks that enable a user to instruct or communicate with a computer. See also Programming languages and Machine language.

Courseware: Name for computer programs used in teaching applications.

Cpl: Means character per inch. A common way of describing character density, i.e., how close together characters are in printers.

CP/M: An operating system for Z80 based machines. It is by far the most widely used DOS for Z80 based machines and there is an extremely large software base for it. See also disk operating systems.

CpS: Characters per second. A common way of describing speed in printers.

Cursor: A mark on a video that indicates where the next character will be shown, or where a change can next be made.

Data: Any information used by the computer either I/O or internal information. All internal information is represented in binary.

Disk: A flat, circular magnetic surface on which the computer can store and retrieve data and programs. A flexible or floppy disk is a single 8 inch or 5¼ inch disk of flexible plastic enclosed in an envelope. A hard disk is an assembly of several discs of hard plastic material, mounted one above another on the same spindle. The hard disk holds up to hundreds of millions of bytes – while floppy disks typically hold between 140,000 and three million bytes.

Disk drive: The mechanical device which rotates the disk and positions the read/write head so information can be retrieved or sent to the disk by the computer.

Diskette: Another name for a 5¼ inch floppy disk.

Disk operating system: A set of programs that operate and control one or more disk drives. See CP/M for one example. Other examples are TRSDOS (on TRS 80) and DOS 3.3 (for Apples).

DOS: See disk operating system.

Dot matrix: A type of print head, made up of a matrix of pins, e.g. 8x8. When a character is to be printed the appropriate pins push out and strike the ribbon to paper forming the character.

Dot graphics: These graphics are individual screen pixels. Used by either turning on or off one pixel.

Double-density: Floppy drives that store twice the standard amount of data in the same space. This has been made possible by advance in the medium and the drives.

Dump: Popular term for sending data from a computer to a mass storage device such as disks or tape.

Execute: A command that tells a computer to carry out a user's instructions or program.

Fanfold: A type of paper that although a continuous sheet folds into set length sheets. This is achieved by way of a perforated line at set intervals. It also makes its easy to tear off a length of paper.

File: A continuous collection of characters (or bytes) that the user considers a unit (for example on accounts receivable file), stored on a tape or disk for later use.

Firmware: Programs fixed in a computer's ROM (Read Only Memory); as compared to software, programs held outside the computer.

Floppies: Thin plastic disks with a magnetic coating used for storing information. Called floppies because they are flexible.

Friction feed: A type of paper-feeding system for printers: normal paper in a continuous sheet is gripped between two friction rollers as on a typewriter.

Hardware: The computer itself and peripheral machines for storing, reading in and printing out information.

Hex: Abbreviation for hexadecimal notation, a base-16 numbering system convenient to use with computers.

High-level language: Any Englishlike language, such as BASIC, that provides easier use for untrained programmers. There are now many such languages and dialects of the same language (for example MicroBASIC, PolyBASIC etc).

HIMEM: Denotes the highest address that is available in a memory map.

Input: Any kind of information that one enters into a computer.

Interactive: Refers to the "conversation" or communication between a computer and the operator.

Interface: Any hardware/software system that links a microcomputer and any other device.

I/O "Input/output".

Inverse video: When the background is coloured; e.g. on a black and white screen white becomes background and characters are written in black.

K: The number 1024. Commonly refers to 1024 bytes. Main exception is capacity of individual chips, where K means 1024 bits.

KILOBYTE (or K): Represents 1024 bytes. For example 5K is 5120 bytes (5 x 1024).

Line feed: A control code character found in the ASCII character set. Its normal purpose is to move the cursor down one line (on screen) or move paper up one line (on printer). Does not return the cursor to the left-hand margin.

Machine language: The binary code language that a computer can directly "understand".

Mainframe: The very large computers that banks and other large businesses use are called mainframes. Also in microcomputers the term is sometimes used to describe the core of the machine, i.e. the CPU plus memory.

Mass storage: A place in which large amounts of information are stored, such as a cassette tape or floppy disk.

Megabyte (or Mb): Represents a million bytes.

Memory: The part of the microcomputer that stores information and instructions. Each piece of information or instruction has a unique location assigned to it within a memory. There is internal memory inside the microcomputer itself, and external memory stored on a peripheral device such as disks or tape.

Memory capacity: Amount of available storage space, in Kbytes.

Menu: List of options within a program that allows the operator to choose which part to interact with (see Interactive). The options are displayed on a screen and the operator chooses one. Menus allow user to easily and quickly set into programs without knowing any technical methods.

Microcomputer: A small computer based on a microprocessor.

Microprocessor: The central processing unit or "intelligent" part of a microcomputer. It is contained on a single chip of silicon and controls all the functions and calculations.

Modem: Modulator-demodulator. An instrument that connects a microcomputer to a telephone and allows it to communicate with another computer over the telephone lines.

Network: An interconnected group of computers or terminals linked together for specific communications.

Output: The information a computer displays, prints or transmits after it has processed the input. See input and I/O.

Parallel interface: A type of communications interface used mostly for printers. It sends a whole character of data down eight (commonly) lines, one bit down each line. The most common type of parallel interface for printers is the centronics interface.

Pascal: A high-level language that may eventually rival BASIC in popularity.

PEEK: A command that examines a specific memory location and gives the operator the value there.

Peripherals: All external input or output devices: printer, terminal, drives etc.

Pixel: Picture element. The point on a screen in graphics.

POKE: A command that inserts a value into a specific memory location.

Program: A set or collection of instructions written in a particular programming language that causes a computer to carry out or execute a given operation.

RAM: Random access memory is the very fast memory inside your computer. The access time for any piece is the same. Your program and run-time data are usually stored in RAM.

REM statement: A remark statement in BASIC. It serves as a memo to programmers, and plays no part in the running program.

Resolution: A measure of the number of points (pixels) on a computer screen.

ROM: Read only memory. Any memory in which information or instructions have been permanently fixed.

Serial interface: A type of communications interface used for a wide variety of purposes (printers, terminals, telephone correction etc.). It uses a minimum of two wires, and sends the data one bit at a time down one wire. The most common type of serial interface is RS232C.

Sheet feed: A type of paper feeding system normally used for high-quality document printers. A special device picks up a sheet of paper and feeds it into friction rollers.

Simulation: Creation of a mathematical model on computers that reflects a realistic system.

Software: Any programs used to operate a computer.

System: A collection of hardware and software where the whole is greater that the sum of the parts.

Tractor feed: A type of paper feeding system for printers. Special computer paper with holes along both sides is fed by the tractors gripping these holes.

VDU: Visual display unit. A device that shows computer output on a television screen.

Word: A group of bits that are processed together by the computer. Most microcomputers use eight or 16 bit words.

Kellogg agents

A list of agents for Kellogg farm software was omitted from the June farm software feature because of space requirements. A list of the agents can be obtained from the Kellogg Farm Management Unit, C/- Lincoln College, Canterbury.

CLASSIFIEDS

ZX81, power supply, tape controller, System 80 keyboard completely wired with stand, leads, manual. Worth over $300. Sell $200 ono. Write Grant King, 105 Champion St, Christchurch. Phone 67-517.

FOR SALE. System 80 (Blue Series), 12" Video Monitor and cassettes ($200). $1000. Phone 837-115 (Wellington) after 5.30 pm.

MRS GWENDA HILL, formerly of 30 Gebbie Street, Mosgiel, please contact "Bits & Bytes" Book Club.

MR M.M. RYDER, of Palmerston North, please supply your full address to the subscriptions department, "Bits & Bytes". Omitted when you sent in your payment.

COMPUTERS AND FARMING. Paul Bieleski, of Baker Road, R.D. 1, Te Aroha, a national councillor of the Computer Society, is trying to set up a "special interest group" for people interested in computers and farming. Anyone interested should write to him enclosing three 24-cent stamps and information about themselves. This should include details of their computer (if any), software they are using, and the type of farm they have, the type of computer applications they are interested in, and whether they are prepared to act in an organising role.

FOR SALE. Pegasus microcomputer, $520 ono. Includes 4K Basic ROM, 8K Forth ROMS, 4K Ass/diss. Manuals, Software. Phone Clinton, 82-112 Hastings, evenings.

FOR SALE. TRS80 Model 3, 48K RAM complete with cassette and all manuals. $2500 ono. Telephone Work 661-013, Home 693-393 (Auckland).

I OWN a ZX81 home computer and have a Creed Teleprinter. I would like to hear from anyone who has or can interface these to each other. Contact John Wilkinson, 13 Augusta Street, Hamilton. Phone 54-653.

ANIMATE: Cartoon graphic animator for TRS-80, System 80. Full edit, playback and save facilities with instructions, $18.00. Phone Wellington 286-786.

INFORMATION WANTED on how to communicate between OSBORNE 1 and APPLE II computers, both are using CP/M. Contact L.P. Harris, P.O. Box 771, Hastings.

KAYPRO USERS. Any Kaypro owners interested in joining a users group for the purpose of setting up a programme library/exchange and receiving a newsletter please contact G. Badraun, P.O. Box 37-193, Parnell. Phone 790-198 Bus. Hours.

FREE CLASSIFIED ADS

BITS & BYTES offers free classified advertisements of up to 20 words to members of micro clubs, students and hobbyists generally. Each word above 20 will cost 20c. If the advertisement is to appear more than once, then after the first insertion, the cost is 20c per word per issue.

Computers VIC 20 $580, VIC Printer $860, VIC Disk Drive $1245. Mail order freight included. Write Micromax, PO Box 33-485, Takapuna, Auckland 9.

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